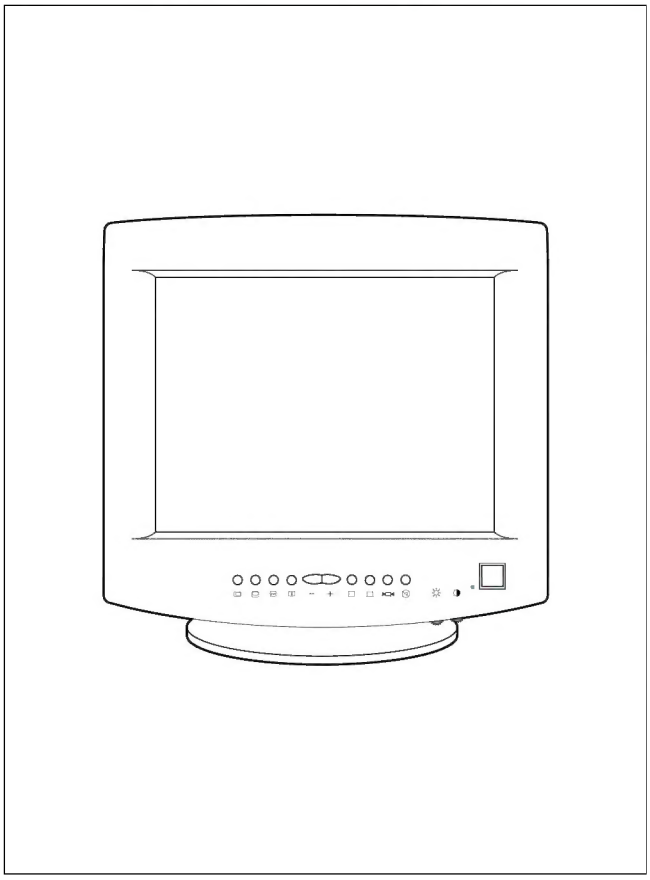
SAMSUNG

COLOR MONITOR

CKE5507L/LM

SERVICE Manual

COLOR MONITOR



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1 Precautions

1-1 Safety Precautions

WARNINGS

1. For continued safety, do not attempt to modify the circuit board.
2. Disconnect the AC power before servicing.
3. When the chassis is operating, semiconductor heatsinks are potential shock hazards.

1-1-1 Servicing the HV VR and CRT :

1. When servicing the high voltage system, remove the static charge by connecting a 10 kohm resistor in series with an insulated wire (such as a test probe) between the chassis and the anode lead.
2. If the HV VR requires adjustment, (a) Replace the VR and adjust the high voltage to the specification. (b) Use a soldering iron to melt the adjustment cap on the HV VR to prevent any movement.
3. When troubleshooting a monitor with excessively HV, avoid being unnecessarily close to the monitor. Do not operate the monitor for longer than is necessary to locate the cause of excessive voltage.
4. High voltage should always be kept at the rated value, no higher. Only when high voltage is excessive are X-rays capable of penetrating the shell of the CRT, including the lead in glass material. Operation at high voltages may also cause failure of the CRT or high voltage circuitry.
5. When the HV regulator is operating properly, there is no possibility of an X-ray problem. Make sure the HV does not exceed its specified value and that it is regulating correctly.
6. The CRT is especially designed to prohibit X-ray emissions. To ensure continued X-ray protection, replace the CRT only with one that is the same or equivalent type as the original.
7. Handle the CRT only when wearing shatterproof goggles and after completely discharging the high voltage anode.
8. Do not lift the CRT by the neck.

1-1-2 Fire and Shock Hazard :

Before returning the monitor to the user, perform the following safety checks:

1. Inspect each lead dress to make certain that the leads are not pinched or that hardware is not lodged between the chassis and other metal parts in the monitor.
2. Inspect all protective devices such as nonmetallic control knobs, insulating materials, cabinet backs, adjustment and compartment covers or shields, isolation resistor-capacitor networks, mechanical insulators, etc.
3. Leakage Current Hot Check (Figure 1-1):
   WARNING: Do not use an isolation transformer during this test.
   Use a leakage current tester or a metering system that complies with American National Standards Institute (*ANSI C101.1, Leakage Current for Appliances*), and Underwriters Laboratories (*UL Publication UL1410, 59.7*).
4. With the unit completely reassembled, plug the AC line cord directly into a 120V AC outlet. With the unit's AC switch first in the ON position and then OFF, measure the current between a known earth ground (metal water pipe, conduit, etc.) and all exposed metal parts, including: metal cabinets, screwheads and control shafts. The current measured should not exceed 0.5 milliamp. Reverse the power-plug prongs in the AC outlet and repeat the test.

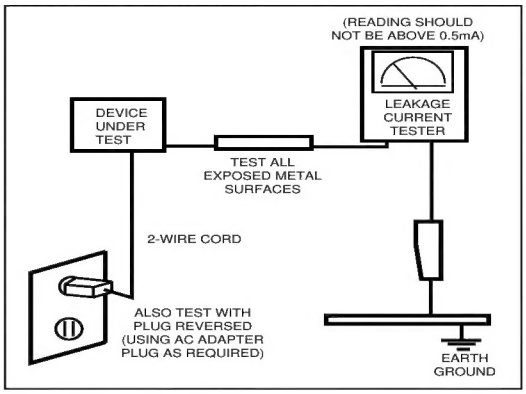

(READING SHOULD NOT BE ABOVE 0.5mA)
LEAKAGE CURRENT TESTER
DEVICE UNDER TEST
TEST ALL EXPOSED METAL SURFACES
2-WIRE CORD
ALSO TEST WITH PLUG REVERSED (USING AC ADAPTER PLUG AS REQUIRED)
EARTH GROUND

Figure1-1. Leakage Current Test Circuit

1-1-4 Product Safety Notices

Some electrical and mechanical parts have special safety-related characteristics which are often not evident from visual inspection. The protection they give may not be obtained by replacing them with components rated for higher voltage, wattage, etc. Parts that have special safety characteristics are identified by ⚠ on schematics and parts lists. A substitute replacement that does not have the same safety characteristics as the recommended replacement part might create shock, fire and / or other hazards. Product safety is under review continuously and new instructions are issued whenever appropriate.

Components identified by ☢ on schematics and parts lists must be sealed by a soldering iron after replacement and adjustment.

1-2 Servicing Precautions

WARNING1: First read the "Safety Precautions" section of this manual. If unforeseen circumstances create conflict between the servicing precautions and safety precautions, always follow the safety precautions.

WARNING2: A high voltage VR replaced in the wrong direction may cause excessive X-ray emissions.

WARNING3: An electrolytic capacitor installed with the wrong polarity might explode.

1. Servicing precautions are printed on the cabinet, and should be followed closely.
2. Always unplug the unit's AC power cord from the AC power source before attempting to: (a) remove or reinstall any component or assembly, (b) disconnect PCB plugs or connectors, (c) connect all test components in parallel with an electrolytic capacitor.
3. Some components are raised above the printed circuit board for safety. An insulation tube or tape is sometimes used. The internal wiring is sometimes clamped to prevent contact with thermally hot components. Reinstall all such elements to their original position.
4. After servicing, always check that the screws, components and wiring have been correctly reinstalled. Make sure that the area around the serviced part has not been damaged.
5. Check the insulation between the blades of the AC plug and accessible conductive parts (examples: metal panels, input terminals and earphone jacks).
6. Insulation Checking Procedure: Disconnect the power cord from the AC source and turn the power switch ON. Connect an insulation resistance meter (500 V) to the blades of the AC plug.

   The insulation resistance between each blade of the AC plug and accessible conductive parts (see above) should be greater than 1 megohm.
7. Never defeat any of the +B voltage interlocks. Do not apply AC power to the unit (or any of its assemblies) unless all solid-state heat sinks are correctly installed.
8. Always connect a test instrument's ground lead to the instrument chassis ground *before* connecting the positive lead; always remove the instrument's ground lead last.

1-3 Electrostatically Sensitive Devices (ESD) Precautions

Some semiconductor (solid state) devices can be easily damaged by static electricity. Such components are commonly called Electrostatically Sensitive Devices (ESD). Examples of typical ESD devices are integrated circuits and some field-effect transistors. The following techniques will reduce the incidence of component damage caused by static electricity.

1. Immediately before handling any semiconductor components or assemblies, drain the electrostatic charge from your body by touching a known earth ground. Alternatively, wear a discharging wrist-strap device. To avoid a shock hazard, be sure to remove the wrist strap before applying power to the monitor.
2. After removing an ESD-equipped assembly, place it on a conductive surface such as aluminum foil to prevent accumulation of an electrostatic charge.
3. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ESDs.
4. Use only a grounded-tip soldering iron to solder or desolder ESDs.
5. Use only an anti-static solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ESDs.
6. Do not remove a replacement ESD from its protective package until you are ready to install it. Most replacement ESDs are packaged with leads that are electrically shorted together by conductive foam, aluminum foil or other conductive materials.
7. Immediately before removing the protective material from the leads of a replacement ESD, touch the protective material to the chassis or circuit assembly into which the device will be installed.

   Caution: Be sure no power is applied to the chassis or circuit and observe all other safety precautions.
8. Minimize body motions when handling unpackaged replacement ESDs. Motions such as brushing clothes together, or lifting your foot from a carpeted floor can generate enough static electricity to damage an ESD.
9. ⚠ Indicates ESDs on the Schematic Diagram in this manual.

2 Reference Information

2-1 List of Abbreviations, Symbols and Acronyms

2-1-1 Abbreviations

Abbreviation	Definition
ASS'Y	Assembly
B	Blue
B+ADJ	B+Adjustment
B-CUT	Blue-Cutoff
B-GAIN	Blue Gain
BRIGHT	Brightness
C	R-Composition
C-MIC	Condenser Microphone
CLK	Clock
CM	R-Cement
CN	Connector
CONT	Contrast
D-SUB	D-Subminiature
EEP-CLK	Electrically Erasable and Programmable Clock
EXT	External
EXT-MIC	External Microphone
Freq.	Frequency
FU	Fusible
G	Green
G-CUT	Green-Cutoff
G-GAIN	Green Gain
GND	Ground
H	Horizontal
H	Heater
H-DRV	Horizontal Drive
H-DY	Horizontal Deflection Yoke
H-FLB	Horizontal Flyback
H-FV	Horizontal-Feedback Voltage
H-LIN	Horizontal Linearity
H-POSI	Horizontal Position
H-SIZE	Horizontal Size
H/PHONE	Headphone
Hz	Hertz
I-SENSE	Current-Sense
lb	Pound
MAX	Maximum
MIC	Microphone
MIN	Minimum
MP	C-Metalized Polyester
MPP	Metal Polypropylene
MO	R-Metal Oxide

Abbreviation	Definition
OSC	Oscillator
P	C-Polyester
PARA	Parabola
PARALL	Parallelogram
PIN-BAL	Pincushion Balance
PRE-AMP	Pre-Amplifier
PS1	Power Saving1 (suspend)
PS2	Power Saving2 (off)
PWR	Power
R	Red
R-CUT	Red-Cutoff
R-GAIN	Red Gain
RST	Reset
S-PIN	Side Pincushion
S-RASTER	Self Raster
S/W	Switch
SCAP	S Correction Capacitor
SPK	Speaker
SYNC	Synchronization
T	C-Tantalum
TR	Transistor
TRAP	Trapezoid
U-COM	Microprocessor
V	Vertical
V-DY	Vertical Deflection Yoke
V-FLB	Vertical Flyback
V-LIN	Vertical Linearity
V-MUTE	Video Mute
V-OUT	Vertical Output
V-PARA	Vertical Parabola
V-POL	V-Polarity
V-POSI	Vertical Position
V-SENSE	Voltage-Sense
V-SIZE	Vertical Size
WW	R-Wire Wound
X-TAL	Crystal
Ω	ohm
KΩ	1000 ohm
MΩ	1000 KΩ
uF	microfarad (10^{-6}F)
nF	nanofarad (10^{-9}F)
pF	picofarad (10^{-12}F)

2-1-2 Symbols

- Can emit X-radiation
- Hot Ground
- Cold Ground
- Electrostatically Sensitive Device (ESD)
- Provides special safety considerations

2-1-2 Acronyms

Acronym	Definition
ABL	Automatic Brightness Limits
AC	Alternating Current
ACL	Automatic Contrast Limit
AFC	Automatic Frequency Control
ANSI	American National Standards Institute
CMOS	Complementary Metal Oxide Semiconductor
CRT	Cathode Ray Tube
DC	Direct Current
DDC	Data Display Channel
DF	Dynamic Focus
DMM	Digital Multimeter
DPMS	Display Power Management Signaling
DVM	Digital Voltmeter
DY	Deflection York
EEPROM	Electrically Erasable and Programmable Read only Memory
ESD	Electrostatically Sensitive Device
ESF	Electronic Static Field
FBT	Flyback Transformer
FET	Field Effect Transistor
FH	Horizontal Frequency
FS	Fail Safe
FV	Vertical Frequency
GD	Geometric Distortion

Acronym	Definition
H/V	Horizontal/Vertical
HV	High Voltage
I/O	Input/Output
IC	Integrated Circuit
LED	Light Emitting Diode
MAC	Macintosh
MOFA	Mask Outside Frame Assembly
OCP	Over Current Protection
OP AMP	Operational Amplifier
OSD	On Screen Display
P-P	Peak to Peak
PCB	Printed Circuit Board
PLL	Phase Locked Loop
PWM	Pulse Width Modulation
SMPS	Switch Mode Power Supply
SVGA	Super Video Graphics Array
SWEDAC	
TP	Test Point
UL	Underwriters Laboratories
USB	Universal Serial Bus
VESA	Video Electronics Standard Association
VGA	Video Graphics Array
VR	Variable Registor
W/B	White Balance

3 Product Specifications

3-1 Specifications

Item	Description
Picture Tube:	15-Inch (38 cm); 13.8-inch (35 cm) viewable, Full-square flat-face tube, 90° Deflection, 0.28 mm Dot pitch, Semi-tint, Non-glare, Antistatic silica coating, Invar shadow mask, Mini-neck
Scanning Frequency	Horizontal : 30 kHz to 61 kHz (Automatic) Vertical : 50 Hz to 120 Hz (Automatic)
Display Colors	Unlimited colors
Maximum Resolution	Horizontal : 1024 Dots Vertical : 768 Lines
Input Video Signal	Analog, 0.714 Vp-p positive at 75 Ω, internally terminated
Input Sync Signal	Separate Sync : TTL level positive/negative Composite Sync : TTL level positive/negative
Maximum Pixel Clock	80 MHz
Active Display	Horizontal : 267 mm ± 3 mm (4:3 ratio) Vertical : 200 mm ± 3 mm
Input Voltage	AC 90 to 264 Volts, 60 Hz/50 Hz ± 3 Hz
Power Consumption	85 Watt (max)
DC Output	DC 12 Volt
Dimensions Unit (W x D x H) Carton (W x D x H)	 15.9 x 16.6 x 15.6 Inches (403 x 421.4 x 396.4 mm) 20.4 x 22.6 x 18.9 Inches (518 x 573 x 462 mm)
Weight (Net/Gross)	35.3 lbs (16.0 kg) / 41.9 lbs (19.0 kg)
Environmental Considerations	Operating Temperature : 32°F to 104°F (0°C to 40°C) Humidity : 10 % to 80 % Storage Temperature : -4°F to 113°F (-20°C to 45°C) Humidity : 5 % to 95 %

- CKE5507L/LM complies with SWEDAC (MPR II) recommendations for reduced electromagnetic fields.
- Designs and specifications are subject to change without prior notice.

3-2 Pin Assignments

Sync Type / Pin No.	15-Pin Signal Cable Connector (Figure 3-1)		Cable Adapter (Figure 3-2)
	Separate	Composite	Macintosh
1	Red	Red	GND-R
2	Green	Green	Red
3	Blue	Blue	H/V Sync
4	GND	GND	Sense 0
5	DDC Return	DDC Return	Green
6	GND-R	GND-R	GND-G
7	GND-G	GND-G	Sense 1
8	GND-B	GND-B	Reserved
9	Reserved	Reserved	Blue
10	GND-Sync/Self-raster	GND-Sync/Self-raster	Sense 2
11	GND	GND	GND
12	DDC Data	DDC Data	V-Sync
13	H-Sync	H/V-Sync	GND-B
14	V-Sync	Not Used	GND
15	DDC Clock	DDC Clock	H-Sync

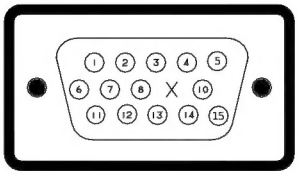


Figure 3-1. Male Type

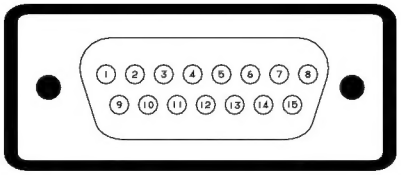


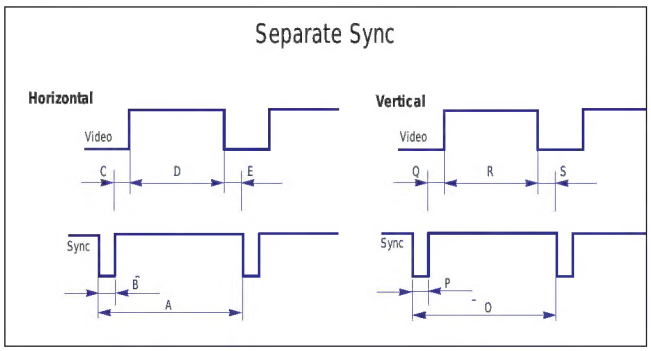
Figure 3-2. Male Type

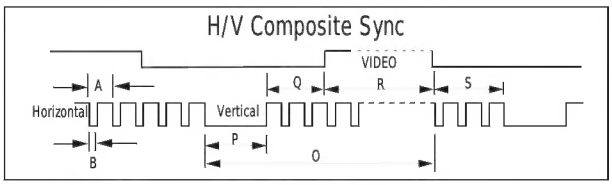
3-3 Timing Chart

This section of the service manual describes the timing that the computer industry recognizes as standard for computer-generated video signals.

Table 2-1. Timing Chart

Mode / Timing	IBM		VESA				
	720/70 Hz 720 x 400	640/60 Hz 640 x 480	640/75 Hz 640 x 480	640/85 Hz 640 x 480	800/75 Hz 800 x 600	800/85 Hz 800 x 600	1024/75 Hz 1024 x 768
fH (kHz)	31.469	31.469	37.500	43.269	46.875	53.674	60.023
A µsec	31.777	31.778	26.667	23.111	21.333	18.631	16.660
B µsec	3.813	3.813	2.032	1.556	1.616	1.138	13.003
C µsec	1.907	1.907	3.810	2.222	3.232	2.702	3.658
D µsec	25.422	25.422	20.317	17.778	16.162	14.222	13.206
E µsec	0.636	0.636	0.508	1.556	0.323	0.569	3.454
fV (Hz)	70.087	59.940	75.000	85.008	75.000	85.061	75.029
O msec	14.268	16.683	13.333	11.764	13.333	11.756	13.328
P msec	0.064	0.064	0.080	0.069	0.064	0.056	12.795
Q msec	1.080	1.048	0.427	0.578	0.448	0.503	0.533
R msec	12.711	15.253	12.800	11.093	12.800	11.179	12.812
S msec	0.413	0.318	0.027	0.023	0.021	0.019	0.516
Clock Frequency (M Hz)	28.322	25.175	31.500	36.000	49.500	56.250	78.750
Polarity H.Sync	Negative	Negative	Negative	Negative	Positive	Positive	Positive
V.Sync	Positive	Negative	Negative	Negative	Positive	Positive	Positive
Remark	Separate	Separate	Separate	Separate	Separate	Separate	Separate





A : Line time total	B : Horizontal sync width	O : Frame time total	P : Vertical sync width
C : Back porch	D : Active time	Q : Back porch	R : Active time
E : Front porch		S : Front porch	

Memo

4 Opearating Instructions

4-1 Front View and Controls

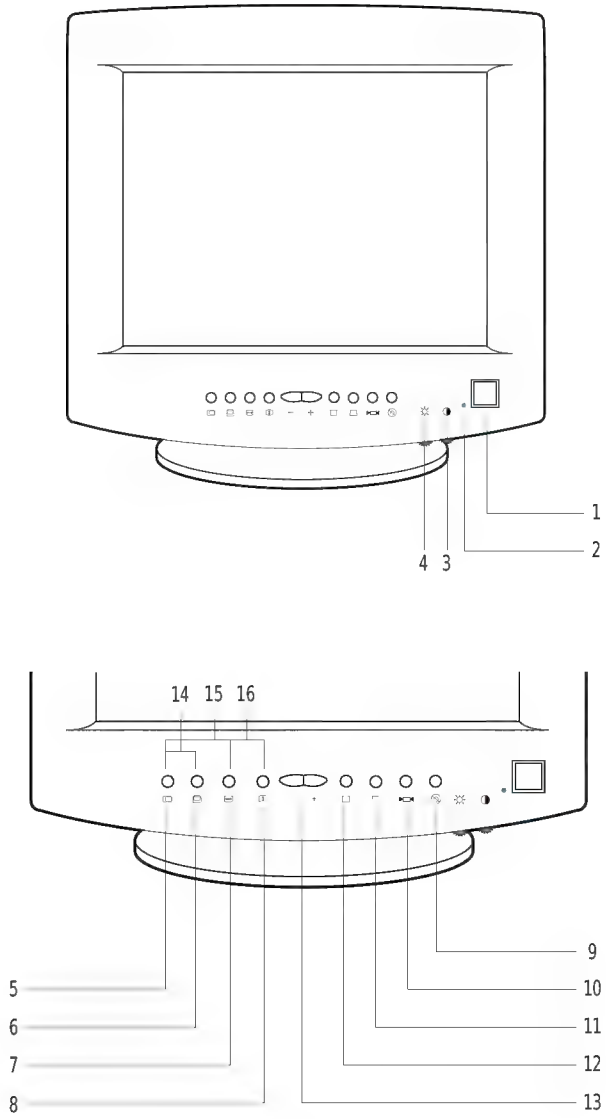


Figure 4-1. Front Control Panel

Table 4-1. Front Panel Controls

Location	Symbol	Description
1		Power Button
2		Power Indicator LED (Dual Color)
3		Contrast Control
4		Brightness Control
5		Horizontal Position Button
6		Vertical Position Button
7		Horizontal Size Button
8		Vertical Size Button
9		Degauss Button
10		Recall Button
11		Trapezoid Button
12		Side Pincushion Button
13		Adjustment Buttons
14	+	Parallelogram
15	+	Pinbalance Button
16	+	Moire ON/OFF

Note 1: When used with a computer equipped with VESA DPMS functions, this monitor is EPA Energy Star compliant and NUTEK compliant.

Table 4-2. Display Power Management Signaling (DPMS)

State / Items	Normal Operation	Power saving function EPA/NUTEK		
		Stand-By Mode	Suspend Mode Position A	Power Off Mode Position B
Horizontal Sync	Active	Inactive	Active	Inactive
Vertical Sync	Active	Active	Inactive	Inactive
Video	Active	Blanked	Blanked	Blanked
Power Indicator	Green	Amber	Alternating Amber/Green Blinking	Amber Blinking
Power Consumption/hr	85 W (max.) 75 W (nominal)	70 W (max.) 66.5 W	Less than 15 W	Less than 8 W

5 Disassembly and Reassembly

This section of the service manual describes the disassembly and reassembly procedures for the CKE5507L/LM monitor.

WARNING: This monitor contains electrostatically sensitive devices. Use caution when handling these components.

5-1 Disassembly

Cautions: 1. Disconnect the monitor from the power source before disassembly.
2. Follow these directions carefully; never use metal instruments to pry apart the cabinet.

5-1-1 Cabinet Disassembly

1. With a pad beneath it, stand the monitor on its front with the screen facing downward and the base closest to you. Make sure nothing will damage the screen.
2. Press in the tab on the Cabinet Bottom and pull the Tilt and Swivel Base upward to remove it.
3. Working from the back of the monitor, remove the four screws and remove the Rear Cover.
4. Using pinch-nose pliers or long-nose pliers, carefully disconnect the Anode Cap from the CRT.

Caution: Do not touch the anode contact on the CRT.

5-1-2 Removing the CRT Socket PCB

1. Complete all previous steps.
2. Disconnect CRT and Main PCB ground wires on CRT Socket PCB and Shield Cover.
3. Desolder the 5 tabs on the underside of the CRT Socket PCB shield and remove the CRT Socket PCB Shield.
4. Using a knife, cut through the silicone bond and lift off the CRT Socket PCB.
5. Disconnect connectors CN101 and 3 ground wires on the CRT Socket PCB.

5-1-3 Removing the Main PCB

1. Complete all previous steps.
2. Disconnect Degaussing Coil at the CN601 connector on the Main PCB.
3. Disconnect all easily accessible ground wires on the Main PCB and Chassis Bottom.
4. Disconnect the DY connector between the DY and the CN301, CN302, CN502 and CN503 connector on the Main PCB.
5. Remove the screws on the back and along each side of the Chassis Bottom.
6. Carefully lift the Main PCB Ass'y.
7. Remove all other ground wires.

5-1-4 CRT Ass'y Disassembly

1. Complete all previous steps.
2. Straighten the Degaussing Coil Assembly coated metal ties and lift Coil Ass'y from the CRT.
3. Remove the four corner screws and lift the CRT up and away from the Front Cover Assembly and place it on a padded surface.

Caution: Do not lift the CRT by the neck.
If you will be returning this CRT to the monitor, be sure to place the CRT face downward on a protective pad.

5-2 Reassembly

With the CRT facing downward on a protective pad, use the steps that follow to reassemble the monitor.

5-2-1 Replacing the CRT

1. Loop the CRT Ground Ass'y around the back of the CRT and under the four corner metal ears. Position last the corner with the spring.
2. With the Front Cover Assembly lying face down on a protective pad, position the CRT so that the corner metal ears fit properly in the Front Cover Assembly.
3. Secure the CRT ground Ass'y and CRT at each of the four corners with the CRT screws.
4. Replace the Degaussing Coil Assembly and wrap the Coil with the ties to hold the Coil in place.

5-2-2 Replacing the Main PCB

1. Stand the monitor on its front with the screen facing downward.
2. Slide the Main PCB into the Chassis Bottom and replace the wires and screws on the Chassis Bottom.
3. Replace connector CN203 on the Main PCB.
4. Position the Main PCB Ass'y in the front Cabinet and secure it with the screws.
5. Replace both side CRT ground wires on the Chassis Bottom.
6. Replace the Degaussing Coil at the CN601 connector on the Main PCB.
7. Replace the DY connector at the CN301, CN302, CN502 and CN503 connector on the Main PCB.
8. Replace all easily accessible ground wires on the Main PCB and Chassis Bottom.
9. Replace the Anode Cap.

5-2-3 Replacing the CRT Socket PCB

1. Lock the Focus (G3) wire on the CRT Socket and reconnect the Screen (G2) wire on the CRT Socket PCB.
2. Reconnect the CRT Socket on the CRT pins and apply silicon bond at the Plug/Socket Junction.
3. Replace the CRT and Main PCB ground wires on CRT Socket PCB and Shield Cover.
4. Reconnect the connectors CN202 to the Main PCB.
5. Solder the 5 tabs on the underside of the CRT Socket Shield.

5-2-4 Cabinet Reassembly

1. Complete all previous steps.
2. Position the Rear Cover marking sure the tabs along the front edge are properly snapped in place. Replace the four screws.
3. Snap the Tilt and Swivel Base into position.
4. Set the monitor on its Base and make sure that the CRT faceplate was not scratched or otherwise damaged.

6 Alignment and Adjustments

This section of the service manual explains how to make permanent adjustments to the monitor. Directions are given for adjustments using the monitor Interface Board Ver. 2.0 and software (SoftJig).

6-1 Adjustment Conditions

Caution: Changes made without the SoftJ ig are saved only to the user mode settings. As such, the settings are not permanently stored and may be inadvertently deleted by the user.

6-1-1 Before Making Adjustments

6-1-1 (a) ORIENTATION

When servicing, always face the monitor to the east.

6-1-1 (b) MAGNETIC FIELDS

Whenever possible, use magnetic field isolation equipment such as a Helmholtz field to surround the monitor. If a Helmholtz field is not available, frequently degauss the unit under test.

Caution: Other electrical equipment may cause external magnetic fields which may interfere with monitor performance.

Use an external degaussing coil to limit magnetic build up on the monitor. If an external degaussing coil is not available, use the internal degaussing circuit. However, do not use the internal degaussing circuit more than once per 30 minutes.

6-1-1 (c) WARM-UP TIME

The monitor must be on for 30 minutes before starting alignment procedures. Warm-up time is especially critical in Color Temperature and White Balance adjustments.

6-1-1 (d) SIGNAL

Analog, 0.714 Vp-p positive at 75 ohm, internal termination
Sync: Separate (TTL level negative/positive)

6-1-1 (e) SCANNING FREQUENCY

Horizontal:	30 kHz to 61 kHz (automatic)
Vertical:	50 Hz to 120 Hz (automatic)

Unless otherwise specified, adjust at the 800 x 600 mode (H : 53.7 kHz, V: 85 Hz) signals.

Refer to Table on page 3-3.

6-1-1 (f) CENTER RASTER

Adjust SW401 so that the back raster comes to the center when you apply a signal of 60 kHz/75 Hz.

6-1-1 (g) MINIMUM SIZE ADJUSTMENT

Scanning frequency:	60 kHz/75 Hz
Display image:	Crosshatch pattern
Brightness:	Maximum
Contrast:	Maximum

Check the horizontal size 252 mm ± 2 mm by using VR401.

6-1-1 (h) BRIGHTNESS AND CONTRAST

Unless otherwise specified, adjust External VRs.

Brightness:	Maximum (turn knob fully clockwise)
Contrast:	Maximum (turn knob fully clockwise)

6-1-2 Required Equipment

The following equipment may be necessary for adjustment procedures:

6-1-2 (a) DISPLAY CONTROL ADJUSTMENT

1. Non-metallic (–) screwdriver: 1.5 mm
   Non-metallic (–) screwdriver: 3 mm
2. Philips (+) screwdriver: 1.5 mm
3. Non-metallic hexkey: 2.5 mm
4. Digital Multimeter (DMM), or
   Digital Voltmeter (DVM)
5. Signal generator, or
   Computer with a video board that uses the ET-4000 chipset (strongly recommended if using Samsung DM 200 software) and that displays: 800 x 600 @ 85 Hz, or 1024 x 768 @ 75 Hz (minimum).
6. Required software: Softjig.exe from Samsung, Samsung DM200, or DisplayMate for Windows from Sonera Technologies
7. Interface Board Ver. 2.0 Code No. BH81-90001K
8. Parallel communications cable (25-pin to 25-pin); Code No. BH81-90001H
9. Signal cable (15-pin to 15-pin cable with additional 3-pin connector); Code No. BH81-90001J
10. 5 V DC adapter, not supplied

Note: SoftJig Assembly (includes items 8, 9 and 10 Code No. BH81-90001L

6-1-2 (b) COLOR ADJUSTMENTS

1. All equipment listed in 6-1-2 (a), above
2. Color analyzer, or any luminance measurement equipment

6-1-3 Connecting the SoftJig

Connect the monitor to the signal generator and/or PC as illustrated in Figures 6-1 and 6-2.

Note: The signal cable connector which includes the 3-wire cable must connect to the monitor. If you use Setup 2 (PC only, no signal generator) you can only make adjustments to the signal timing available on that computer system. To make corrections to all factory timings requires the use of an additional signal generator.

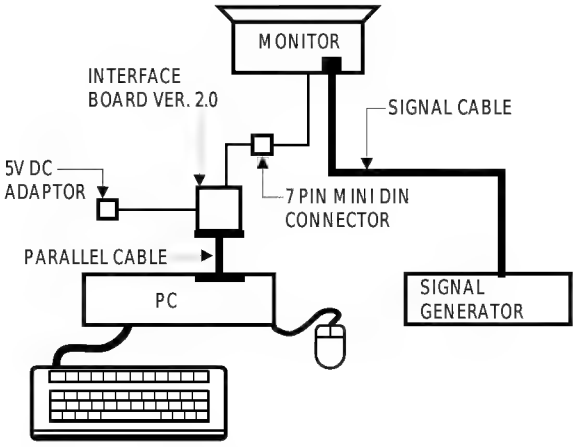


Figure 6-1. Setup 1, With Signal Generator

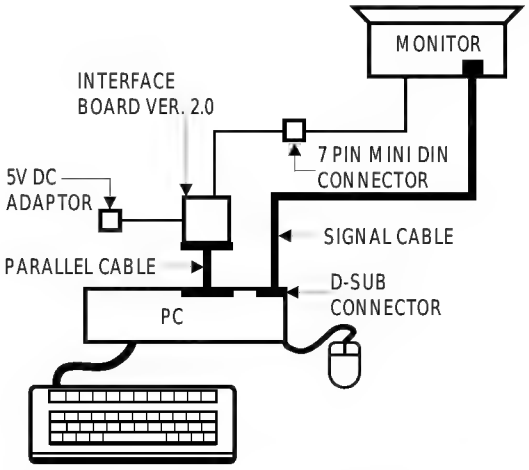


Figure 6-2. Setup 2, Without Signal Generator

6-1-4 After Making Adjustments

After finishing all adjustments, test the monitor in all directions. If, for example, the monitor does not meet adjustment specifications when facing north, reposition the monitor to face east and readjust. This time, try for an adjustment closer to the ideal setting within the tolerance range. Test the unit again in all directions. If the monitor again fails to meet specifications in every direction, contact your Regional After Service Center for possible CRT replacement.

6-2 Display Control Adjustments

6-2-1 Centering

Centering means to position the center point of the display in the middle of the display area. Horizontal size and position and vertical size and position control the centering of the display.

Adjust the horizontal size and vertical size to their optimal settings: 267 mm (H) x 200 mm (V)

Adjust the horizontal position and vertical position to within 4.0 mm of the center point of the screen.

$|A - B| \leq 4.0$ mm.
$|C - D| \leq 4.0$ mm.

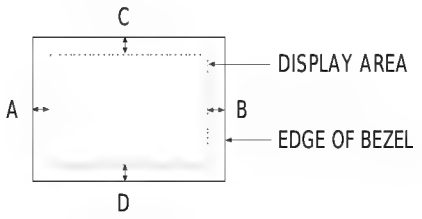


Figure 6-3. Centering

6-2-1 (a) HORIZONTAL SIZE ADJUSTMENT

CONDITIONS

Scanning frequency: 53.7 kHz/85 Hz
Display image: Crosshatch pattern
Brightness: Maximum
Contrast: Maximum

Adjust the horizontal size of the display pattern to 267 mm. (Tolerance ± 3 mm.)

6-2-1 (b) VERTICAL SIZE ADJUSTMENT

CONDITIONS

Scanning frequency: 53.7 kHz/85 Hz
Display image: Crosshatch pattern
Brightness: Maximum
Contrast: Maximum

Adjust the vertical size of the display pattern to 200 mm. (Tolerance: ± 3 mm.)

6-2-1 (c) HORIZONTAL POSITION ADJUSTMENT

CONDITIONS

Scanning frequency: 53.7 kHz/85 Hz
Display image: Crosshatch pattern

PROCEDURE

Center the test pattern on the raster.

6-2-1 (d) VERTICAL POSITION ADJUSTMENT

CONDITIONS

Scanning frequency: 53.7 kHz/85 Hz
Display image: Crosshatch pattern

Center the test pattern on the raster.

6-2-2 Linearity

Linearity affects the symmetry of images as they appear on the screen. Unless each row or column of blocks in a crosshatch pattern is of equal size, or within the tolerances shown in Tables 6-1 and 6-2, an image appears distorted, elongated or squashed.

The formular of linearity (%)

$$= \frac{2 \times (Max - Min)}{Max + Min} \times 100$$

Table 5-1. Standard Modes Linearity: 800x600/85Hz

	Standard Timing Modes	
	Each block (10 %)	Difference between adjacent blocks (4 %)

Table 5-2. Other Modes Linearity: VGA, SVGA, XGA, MAC, etc.

	Supported Timing Mode	
	Each block (14 %)	Difference between adjacent blocks (5 %)

6-2-3 Trapezoid Adjustment

CONDITIONS

Scanning frequency: 53.7 kHz/85 Hz
Display image: Crosshatch pattern

Make the the test pattern rectangular.

$|A - B| < 4$ mm

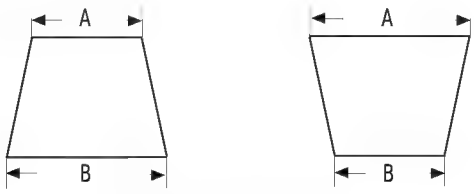


Figure 6-4. Trapezoid

6-2-4 Parallelogram Adjustment

CONDITIONS

Scanning frequency: 53.7 kHz/85 Hz
Display image: Crosshatch pattern

To activate the Parallelogram Adjustment function, push both the Horizontal Position and Vertical Position buttons and hold them in for longer than 3 seconds, or until the power indicator LED changes from amber to green and back to amber.

Use the Increase (+) and Decrease (–) buttons to correct the display shape.

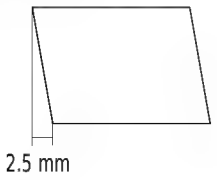


Figure 6-5. Parallelogram

6-2-5 Side Pincushion Adjustment

CONDITIONS

Scanning frequency: 53.7 kHz/85 Hz
Display image: Crosshatch pattern

After pushing the Side Pincushion button once, push the Increase (+) and Decrease (–) buttons to straighten the sides of the test pattern.

$|C1|, |C2| \leq 1.5$ mm, $|D1|, |D2| \leq 1.5$ mm.

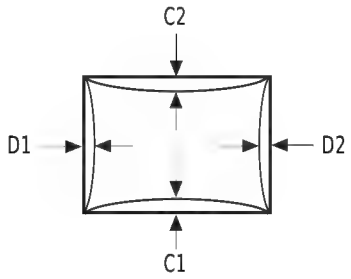


Figure 6-6. Pincushion

6-2-6 CRT Tilt Adjustment

TILT ADJUSTMENT

To activate the tilt adjustment, push both the vertical position and horizontal size buttons and hold then in for longer than 3 seconds, or until the power indicator LED changes from amber to green and back to amber.

Use the Increase (+) and Decrease (–) buttons to correct the display shape.

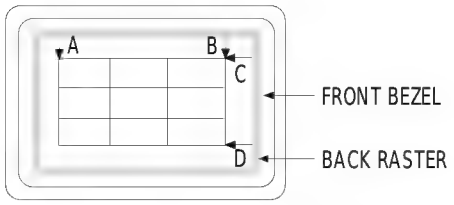


Figure 6-7. CRT Tilt Adjustment

6-2-7 Pin Balance Adjustments

To activate the pin balacne function, push both the horizontal position and horizontal size buttons and hold then in for longer than 3 seconds, or until the power indicator LED changes from amber to green and back to amber.

Use the Increase (+) and Decrease (–) buttons to correct the display shape.

6-2-8 Degauss

Push the contrast and brightness buttons simultaneously. The degaussing circuit can effectively function only once per 30 minutes. If available, use an external degaussing coil during servicing.

WARNING: Do Not hold the Degauss button down for longer than 3 seconds. If you do, it resets all of the data in the user memory area. If this occurs, you must remake the user adjustments.

6-2-9 Delete User Mode Data

To delete the picture data from the user modes, push the Degauss button for 5 or more seconds.

6-2-10 Recall

To delete the picture data from current user mode, push the Recall button.

6-3 Color Adjustments

Note: To make color adjustments you must have a color analyzer and one of the following configurations:

1. Signal Generator
   or
2. Computer with Samsung DM 200 software or DisplayMate for Windows software from Sonera Technologies

Before making adjustments, check that the video signals are as follows:

Video : Analog, 0.714 Vp-p (at 75 Ω termination)
Sync : Separate TTL level
Unless otherwise specified, use 800 x 600 mode signal (53.7 kHz/85 Hz) for adjustments.

6-3-1 Color Coordinates (Temperature)

Color temperature is a measurement of the radiant energy transmitted by a color. For computer monitors, the color temperature refers to the radiant energy transmitted by white. Color coordinates are the X and Y coordinates on the chromaticity diagram of wavelengths for the visible spectrum.

CONDITIONS

Measurement instrument:	Color analyzer
Scanning frequency:	53.7 kHz/85 Hz
Display image:	White flat field at center of display area
Luminance:	Maximum

PROCEDURE

Using the directions in sections 6-3-2 through 6-3-5, adjust the Color Coordinates for 9300K to x = 0.283 ± 0.02 and y = 0.298 ± 0.02

6-3-2 Back Raster Color Adjustment

CONDITIONS

Measurement instrument:	Color analyzer
Scanning frequency:	53.7 kHz/85 Hz
Display image:	Back raster pattern
Brightness:	Maximum
Contrast:	Maximum

PROCEDURE

1. Adjust the Screen VR on the FBT so that the brightness of the Back Raster is 0.3 to 0.5 ft-L (typically 0.4 ft-L).
2. Adjust VR102R (R-Bias) and VR102B (B-Bias) so Back Raster color is white.
   (x = 0.283 ± 0.02 and y = 0.298 ± 0.02)

6-3-3 Video Gain Adjustment

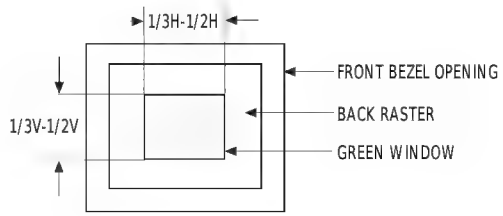


Figure 6-8. Green Box Pattern

CONDITIONS

Measurement instrument:	Color analyzer
Scanning frequency:	53.7 kHz/85 Hz
Display image:	Green box pattern within range for which the ABL circuit is not active (1/3 to 1/2H and 1/3 to 1/2V).
Brightness:	Maximum
Contrast:	Maximum

PROCEDURE

1. Adjust VR102 (G-Gain) so that the brightness of the green gain is 40 ± 1 ft-L (typically 40 ft-L).

6-3-4 White Balance Adjustment

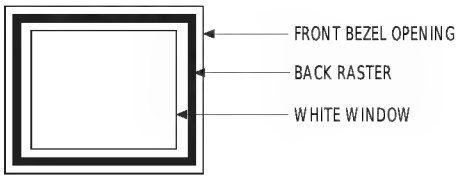


Figure 6-9. Full White Pattern

CONDITIONS

Measurement instrument:	Color analyzer
Scanning frequency:	53.7 kHz/85 Hz
Display image:	Full white pattern
Brightness:	Maximum
Contrast:	Maximum

PROCEDURE

1. Display the full white pattern.
2. Adjust VR101 (R-Gain) and VR103 (B-Gain) so that the video is white.
   (x = 0.283 ± 0.02 and y = 0.298 ± 0.02)

6-3-5 White Balance Fine Adjustment

CONDITIONS

Measurement instrument:	Color analyzer
Scanning frequency:	53.7 kHz/85 Hz
Display image:	Full white pattern
X-Y coordinates:	x = 0.283 ± 0.02
	y = 0.298 ± 0.02

PROCEDURE

1. Adjust the Contrast control so that the brightness of the video is about 5 ft-L.
2. Check whether the white coordinates of the video meet the specification above. If they do not, adjust them so that they do.
3. Adjust the Contrast to maximum luminance.
4. Check whether the white coordinates still meet the specification above. If they do not, adjust them so that they do.

6-3-6 ABL Point Adjustment

CONDITIONS

Measurement instrument:	Color analyzer
Scanning frequency:	53.7 kHz/85 Hz
Display image:	Full white pattern
Brightness:	Maximum
Contrast:	Maximum

PROCEDURE

Adjust VR501 (ACL) so that the brightness level is 40 ± 1 ft-L.

6-3-7 Focus Adjustment

CONDITIONS

Measurement instrument:	Color analyzer
Scanning frequency:	53.7 kHz/85 Hz
Display image:	"H" character pattern
Brightness:	Maximum
Contrast:	Maximum

PROCEDURE

1. Adjust the Focus VR on the FBT to display the sharpest image possible.
2. Use Locktite to seal the Focus VR in position.

6-3-8 Luminance Uniformity Check

CONDITIONS

Measurement instrument:	Color analyzer
Scanning frequency:	53.7 kHz/85 Hz
Display image:	White flat field
Brightness:	Cut off point at 30~40 ft-L

PROCEDURE

Measure luminance at nine points on the display screen: top left corner, top center, top right corner, center row left side, center, center row right side, bottom left corner, bottom center, and bottom right corner.

6-3-9 Color Purity Adjustment

Color purity is the absence of undesired color. Conspicuous mislanding (unexpected color in a uniform field) within the display area shall not be visible at a distance of 50cm from the CRT surface.

CONDITIONS

Orientation:	Monitor facing east
Scanning frequency:	53.7 kHz/85 Hz
Display image:	White flat field
Luminance:	Cutoff point at the center of the display area

Caution: Color purity adjustments should only be attempted by qualified personnel.

PROCEDURE

For trained and experienced service technicians only.

Use the following procedure to correct minor color purity problems:

1. Make sure the display is not affected by external magnetic fields. Use an external degaussing coil to neutralize magnetic fields which may be affecting color purity.
2. Very carefully break the glue seal between the 2-pole purity convergence magnets (PCM), the band and the spacer (see Figure 6-9).
3. Make sure the spacing between the PCM assembly and the CRT stem is 22.5mm ± 1mm.
4. Display a red pattern over the entire display area.
5. Adjust the Purity Magnet Rings on the PCM assembly to display a pure green pattern. (Optimal setting: x = 0.310 ± 0.015, y = 0.592 ± 0.015)
6. Repeat steps 4 and 5 using a red pattern and then again, using a blue pattern.

Table 6-3. Color Purity Tolerances

Red:	x = 0.625 ± 0.015	y = 0.340 ± 0.015
Green:	x = 0.310 ± 0.015	y = 0.592 ± 0.015
Blue:	x = 0.150 ± 0.015	y = 0.063 ± 0.015

(For 9300K white color adjustment: x = 0.283 ± 0.02, y = 0.298 ± 0.02)

7. When you have the PCMs properly adjusted, carefully gule them together with Locktite to prevent their movement during shipping.

6-4 Convergence Adjustments

Misconvergence occurs when one or more of the electron beams in a multibeam CRT fail to meet the other beams at a specified point.

Table 6-4. Misconvergence Tolerances

Position	Error in mm	CRT Dot Pitch
Center (A)	0.30	0.28
Edge (B)	0.40	0.28

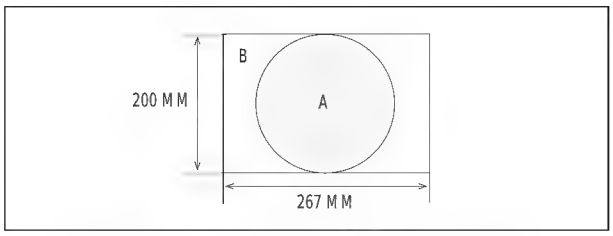
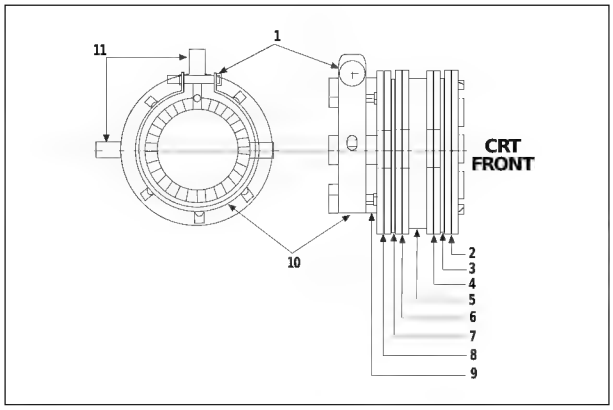


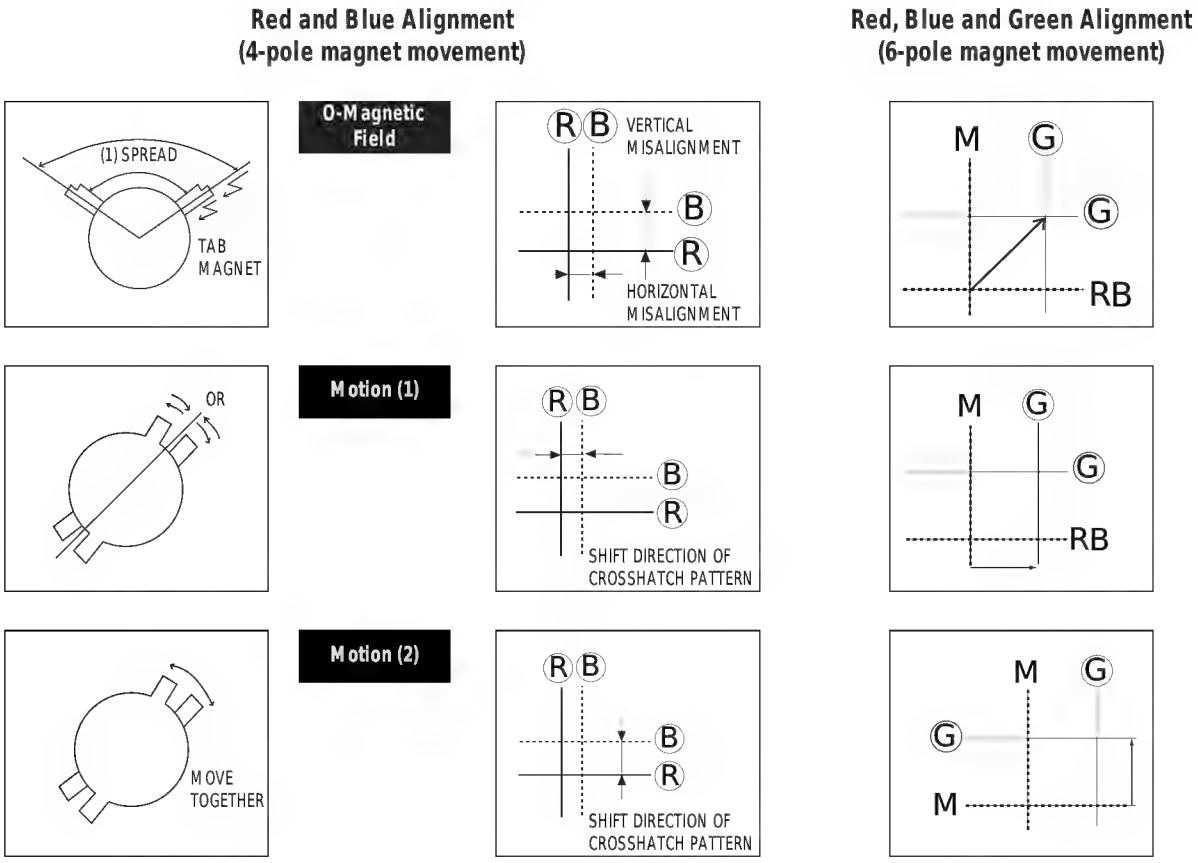
Figure 6-10. Convergence Measurement Areas



Toshiba CRT			
1 Setup Bolt	2 Bow Magnet	3 Spacer	4 2-Pole Magnet
5 Band	6 6-Pole Magnet	7 Spacer	8 4-Pole Magnet
9 Holder	10 Band	11 Tabs	

Figure 6-11. Magnet Configuration

Figure 6-12. Magnet Movements



6-4-1 Static (Center) Convergence

Static convergence involves alignment of the red, blue and green lines in the center area of the display.
See "Dynamic Convergence" for alignment of color fields around the edges of the display.

CONDITIONS

Direction:	Monitor facing east
Warm-up:	30 minutes
Display image:	Crosshatch pattern
Tolerances:	See Table 6-4

PROCEDURE

As shown in Figure 6-11, the CRT used in this monitor has the magnet configuration as shown in Table 6-5.

Table 6-5. Magnet Configurations

CRT Manufacturer	Magnet Order from Front of CRT
SDD	Convergence bow, 2-pole, 4-pole, 6-pole
Toshiba	Convergence bow, 2-pole, 6-pole, 4-pole

Use the following steps to correct any static misconvergence:

1. Locate the pair of 4-pole magnet rings.
2. Unlock the rings and rotate the individual rings (change the spacing between tabs) to converge the vertical red and blue lines.
3. Rotate the pair of rings (maintaining spacing between tabs) to converge the horizontal red and blue lines.
4. After completing the red and blue center convergence adjustment, locate the pair of 6-pole magnet rings.
5. Rotate the individual rings (change the spacing between tabs) to converge the vertical red and blue (magenta) and green lines.
6. Rotate the pair of rings (maintaining the spacing between tabs) to converge the horizontal red and blue (magenta) and green lines. Don't rotate the 2-pole magnets as they adjust for color purity.
7. Mark the correct position for the magnets and apply a small line of glue to hold the magnets in place. Lock the rings in place.

6-4-2 Dynamic (Edge) Convergence

CONDITIONS

Direction:	Monitor facing east
Warm-up:	30 minutes
Display image:	Crosshatch pattern
Tolerances:	See Table 6-4

PROCEDURE

Use the following procedure to correct minor dynamic (edge) misconvergence. If, after using this procedure, dynamic misconvergence is still greater than the tolerance around the periphery of the display area, contact the Regional After Service Center for possible CRT replacement.

1. Make sure the display is not affected by external magnetic fields.
2. Make sure the static convergence is properly adjusted.
3. Strategically place small magnet rubbers on the back of the CRT to correct the misconvergence. Be careful not to remove the paper protecting the adhesive on the magnet rubbers until you are satisfied with their placement and the dynamic convergence.
4. When you are satisfied with the convergence around the edge of the CRT, permanently glue the magnet rubbers to the back of the CRT.

WARNING: Do not remove or change the position of the factory installed wedges. These wedges were installed by the CRT manufacturer and are properly placed for this CRT; their removal may result in damage to the CRT.

6-4-3 Bow Convergence Adjustments

CONDITIONS

Orientation: Monitor facing east.
Display Image: Crosshatch pattern with mixed RGB colors.
Required tools: Philips (+) screwdriver, 1.5 mm Hexkey, 2.5 mm

PROCEDURE

Bow convergence adjustments are not available for the CRTs used in the CKE5507L/LM monitors. While all CRTs have bow convergence magnets, they are sealed in the CRT factory and are not user or service technician adjustable. Do not touch these magnets (see Figure 6-11). If bow convergence adjustment is out of alignment, replace the CRT.

Bow misconvergence should not exceed the values listed in Table 6-5: Misconvergence Tolerances.

6-4-4 Balance Convergence Adjustments

Balance Convergence involves alignment of red and blue lines when they are misaligned at one end more so than at the other end. The Deflection Yoke holds the balance coils which can correct balance misconvergences.

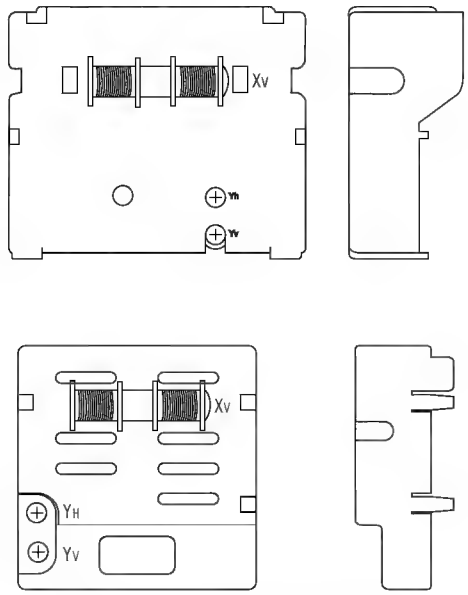


Figure 6-13. Deflection Yoke Caps

6-4-4 (a) HORIZONTAL LINE RED AND BLUE BALANCE CONVERGENCE

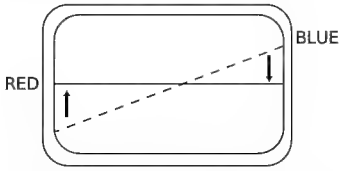


Figure 6-14. Horizontal Line Balance Misconvergence

PROCEDURE

Use a 2.5 mm hexkey at the Horizontal Balance Coil (Xv). Turning it right raises the right end of the blue line and lowers the left end. Turning the VR to the left lowers the right end of the blue line and raises the left end.

6-4-4 (b) VERTICAL RED AND BLUE BALANCE CONVERGENCE

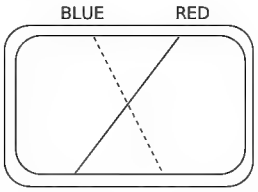


Figure 6-15. Vertical Line Balance Misconvergence

PROCEDURE

Use a 1.5 mm phillips (+) screwdriver at the YH variable resistor. Turning the VR to the left tilts the blue line to the right. Turning it right tilts the blue line to the left.

6-4-4 (c) UPPER AND LOWER HORIZONTAL LINE CONVERGENCE

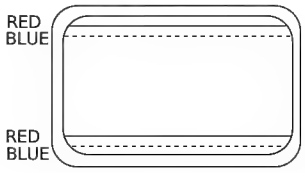


Figure 6-16. Upper and Lower Balance Misconvergence

PROCEDURE

Use a 1.5 mm phillips (+) screwdriver at theYv variable resistor. Turning the VR to the left moves the blue line at the top upward and at the bottom, the line moves downward. Turning it right moves the blue line at the top downward and at the bottom the line moves upward.

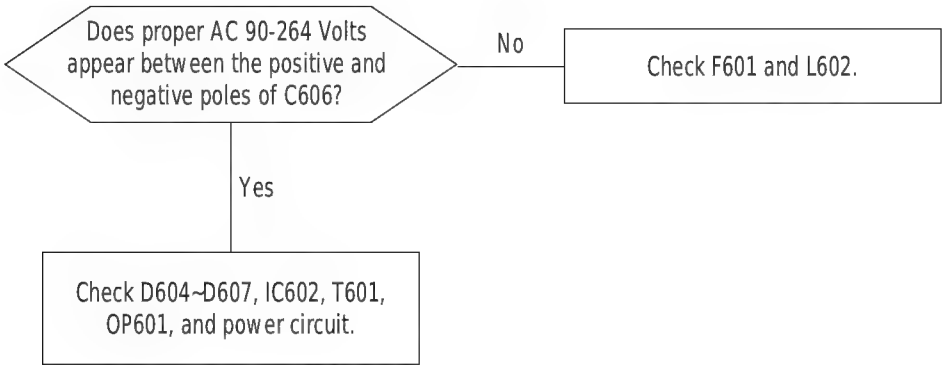
Memo

7 Troubleshooting

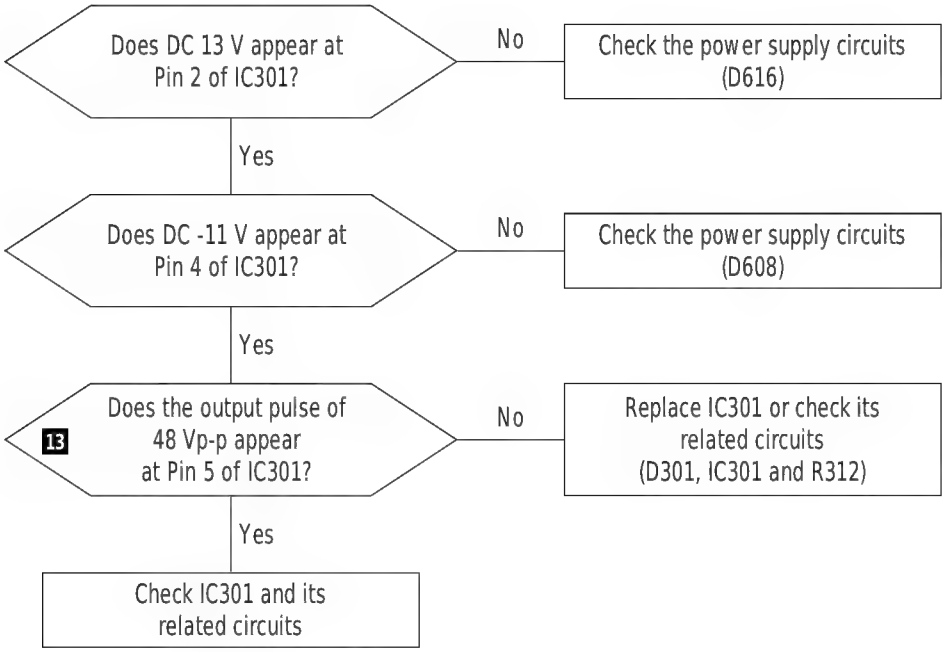
Notes: 1. If a picture does not appear, fully rotate the brightness and contrast controls clockwise and reinspect.

2. Check the following circuits.
   - No raster appears: Power circuit, Horizontal output circuit, H/V control circuit, and H/V output circuit.
   - High voltage develops but no raster appears: Video output circuits.
   - High voltage does not develop: Horizontal output circuits.

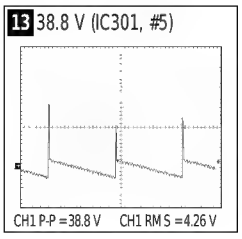
7-1 No Power


Does proper AC 90-264 Volts appear between the positive and negative poles of C606?
No
Check F601 and L602.
Yes
Check D604~D607, IC602, T601, OP601, and power circuit.

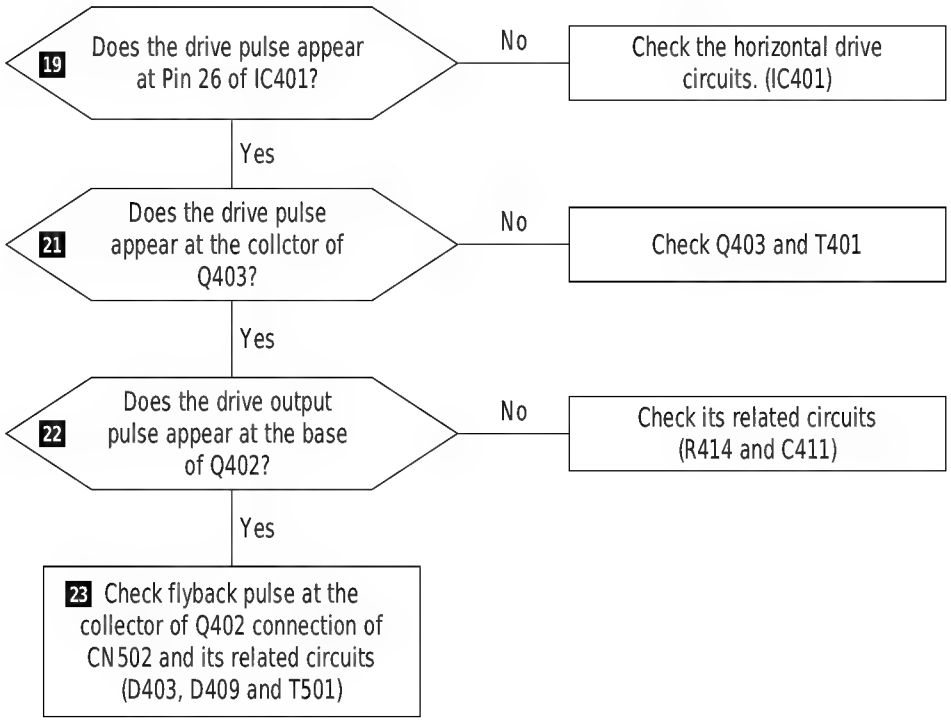
7-2 Horizontal Line on CRT


Does DC 13 V appear at Pin 2 of IC301?
No
Check the power supply circuits (D616)
Yes
Does DC -11 V appear at Pin 4 of IC301?
No
Check the power supply circuits (D608)
Yes
13
Does the output pulse of 48 Vp-p appear at Pin 5 of IC301?
No
Replace IC301 or check its related circuits (D301, IC301 and R312)
Yes
Check IC301 and its related circuits

WAVEFORMS

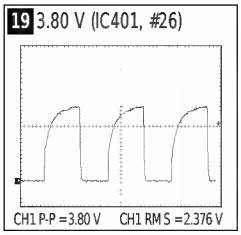


7-3 No Raster

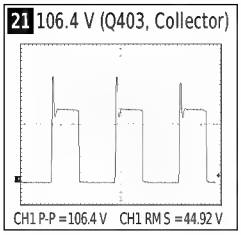

19 Does the drive pulse appear at Pin 26 of IC401?
No
Check the horizontal drive circuits. (IC401)
Yes
21 Does the drive pulse appear at the collctor of Q403?
No
Check Q403 and T401
Yes
22 Does the drive output pulse appear at the base of Q402?
No
Check its related circuits (R414 and C411)
Yes
23 Check flyback pulse at the collector of Q402 connection of CN502 and its related circuits (D403, D409 and T501)

WAVEFORMS

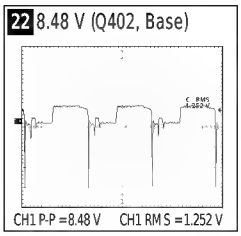
19 3.80 V (IC401, #26)



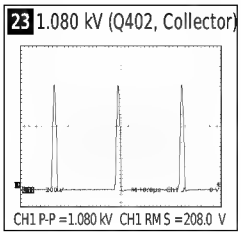
21 106.4 V (Q403, Collector)



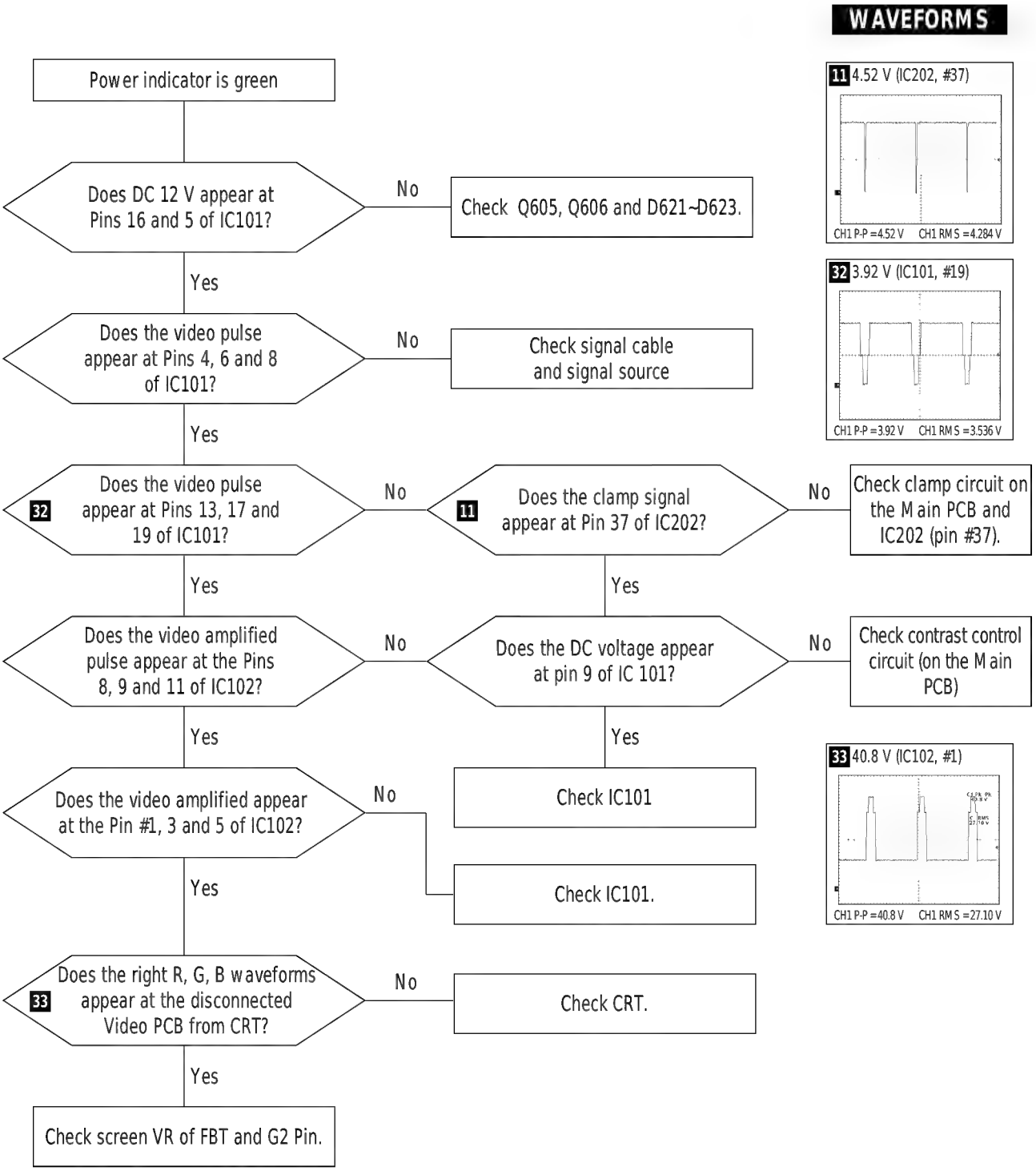
22 8.48 V (Q402, Base)



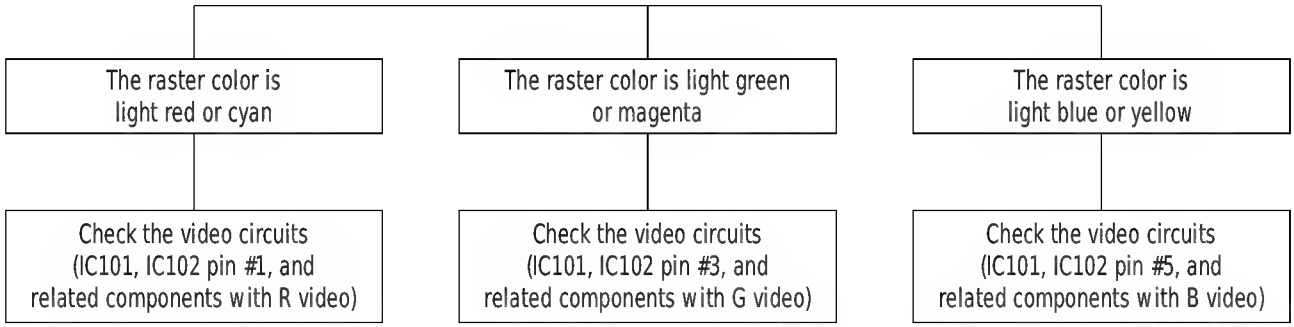
23 1.080 kV (Q402, Collector)



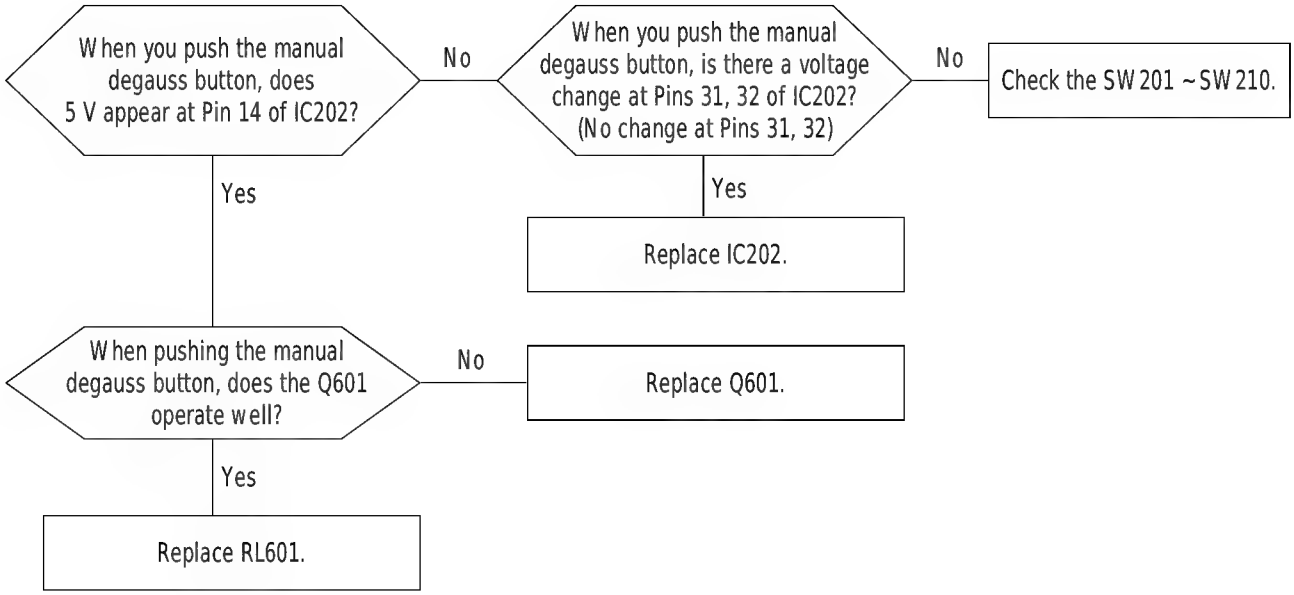
7-4 No Video


Power indicator is green
Does DC 12 V appear at Pins 16 and 5 of IC101?
No
Check Q605, Q606 and D621~D623.
Yes
Does the video pulse appear at Pins 4, 6 and 8 of IC101?
No
Check signal cable and signal source
Yes
32
Does the video pulse appear at Pins 13, 17 and 19 of IC101?
No
11
Does the clamp signal appear at Pin 37 of IC202?
No
Check clamp circuit on the Main PCB and IC202 (pin #37).
Yes
Yes
Does the video amplified pulse appear at the Pins 8, 9 and 11 of IC102?
No
Does the DC voltage appear at pin 9 of IC 101?
No
Check contrast control circuit (on the Main PCB)
Yes
Yes
Does the video amplified appear at the Pin #1, 3 and 5 of IC102?
No
Check IC101
Check IC101.
Yes
33
Does the right R, G, B waveforms appear at the disconnected Video PCB from CRT?
No
Check CRT.
Yes
Check screen VR of FBT and G2 Pin.
WAVEFORMS
11 4.52 V (IC202, #37)
CH1 P-P =4.52 V CH1 RMS =4.284 V
32 3.92 V (IC101, #19)
CH1 P-P =3.92 V CH1 RMS =3.536 V
33 40.8 V (IC102, #1)
CH1 P-P =40.8 V CH1 RMS =27.10 V

7-5 No Specific Color Appears

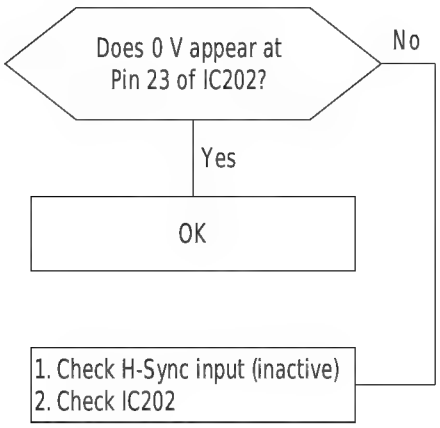

The raster color is light red or cyan
The raster color is light green or magenta
The raster color is light blue or yellow
Check the video circuits (IC101, IC102 pin #1, and related components with R video)
Check the video circuits (IC101, IC102 pin #3, and related components with G video)
Check the video circuits (IC101, IC102 pin #5, and related components with B video)

7-6 Degauss Operation Failure

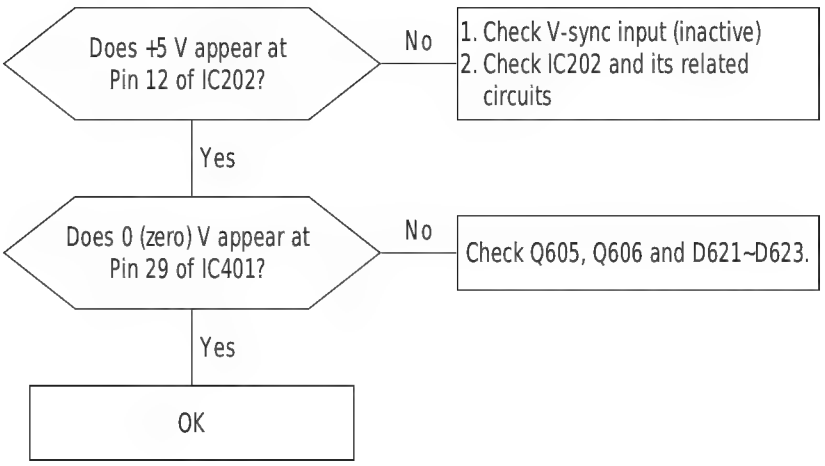

When you push the manual degauss button, does 5 V appear at Pin 14 of IC202?
No
When you push the manual degauss button, is there a voltage change at Pins 31, 32 of IC202? (No change at Pins 31, 32)
No
Check the SW201 ~ SW210.
Yes
Yes
Replace IC202.
When pushing the manual degauss button, does the Q601 operate well?
No
Replace Q601.
Yes
Replace RL601.

7-7 Power Save Management System Failure

7-7-1 Stand-By Mode



7-7-2 Suspend Mode


Does +5 V appear at Pin 12 of IC202?
No
1. Check V-sync input (inactive)
2. Check IC202 and its related circuits
Yes
Does 0 (zero) V appear at Pin 29 of IC401?
No
Check Q605, Q606 and D621~D623.
Yes
OK

7-7-3 Off Mode

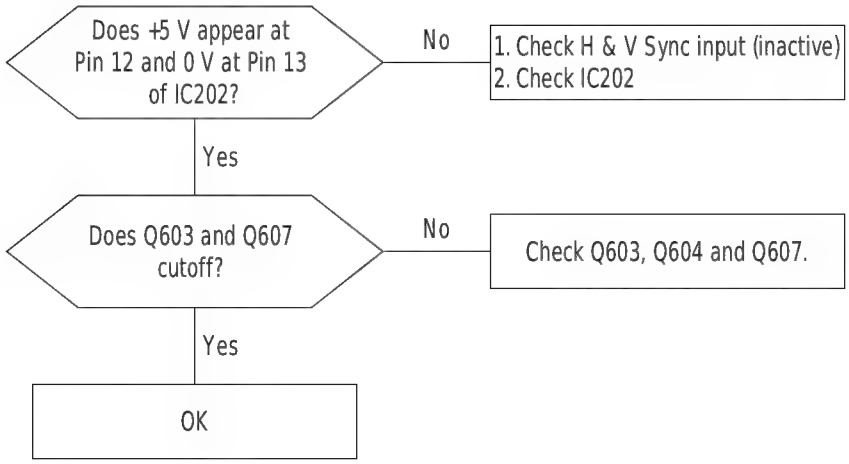
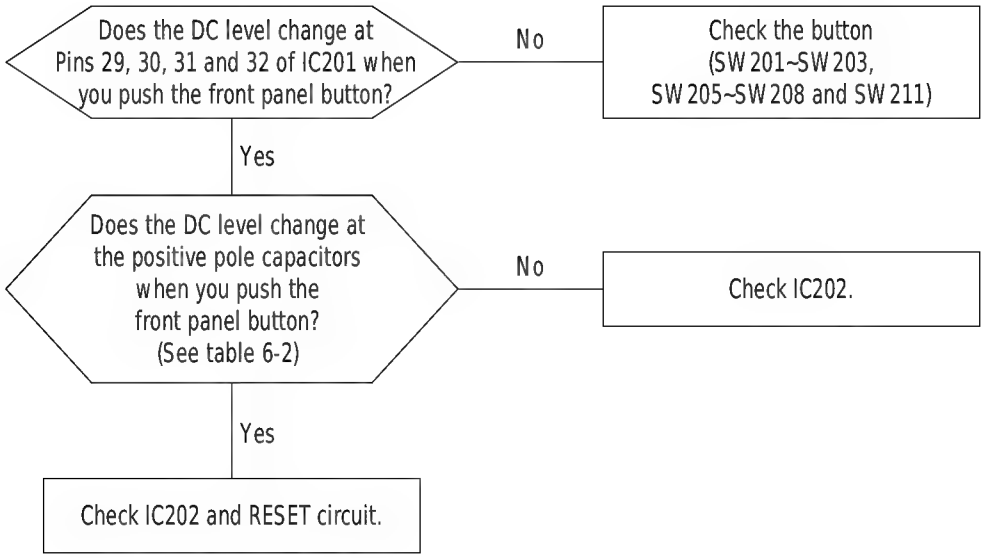

Does +5 V appear at Pin 12 and 0 V at Pin 13 of IC202?
No
1. Check H & V Sync input (inactive)
2. Check IC202
Yes
Does Q603 and Q607 cutoff?
No
Check Q603, Q604 and Q607.
Yes
OK

Table 7-1. DPMS Logic Table

Mode	Sync		Video	LED Color
	H	V		
Normal	Active	Active	Active	Green
Stand-By	Inactive	Active	Blank	Amber
Suspend	Active	Inactive	Blank	Green/Amber blinking
Off	Inactive	Inactive	Blank	Amber blinking

Note: If the signal cable is removed, the DPMS function does not operate and a self raster displays.

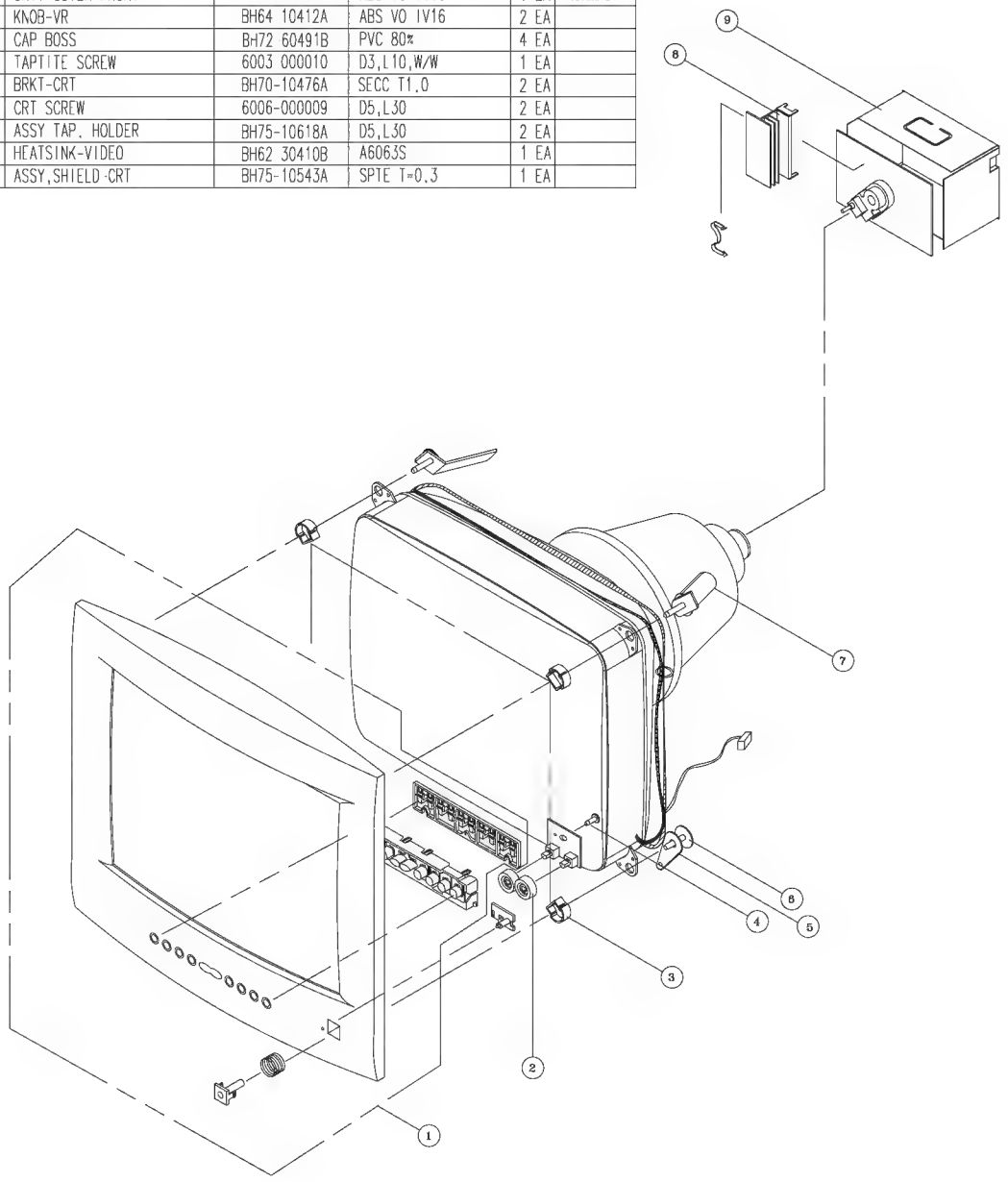
7-8 User Controls Don't Work


Does the DC level change at Pins 29, 30, 31 and 32 of IC201 when you push the front panel button?
No
Check the button (SW201~SW203, SW205~SW208 and SW211)
Yes
Does the DC level change at the positive pole capacitors when you push the front panel button? (See table 6-2)
No
Check IC202.
Yes
Check IC202 and RESET circuit.

8 Exploded View and Parts List

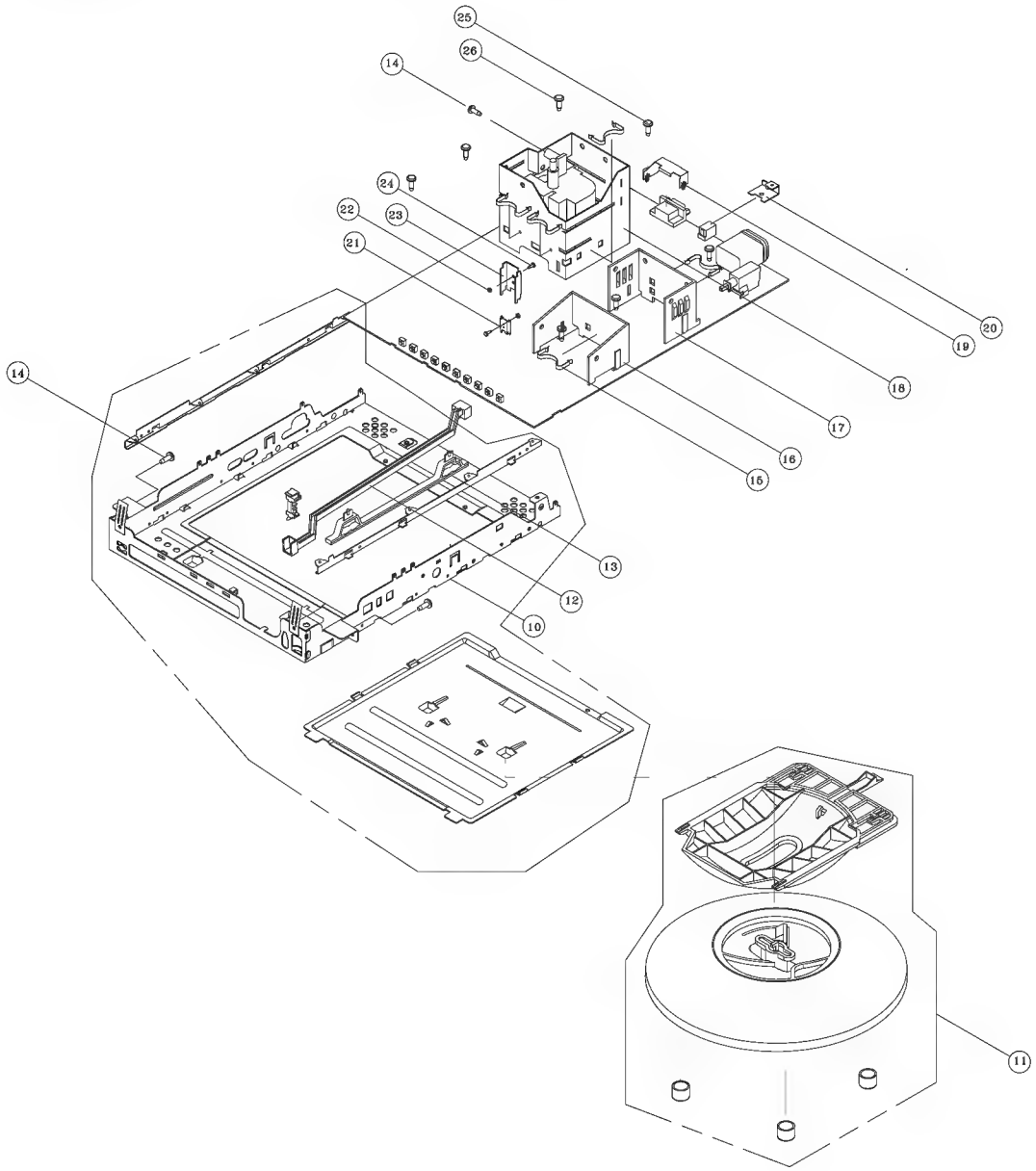
8-1 Front Cover & CRT Ass'y

NO	DESCRIPTION	CODE NO	SPECIFICATION	Q'TY	REMARK
1	UNIT COVER-FRONT	BH75 10631A	ABS V0 1V16	1 EA	NORMAL
2	KNOB-VR	BH64 10412A	ABS V0 1V16	2 EA	
3	CAP BOSS	BH72 60491B	PVC 80%	4 EA	
4	TAPTITE SCREW	6003 000010	D3,L10,W/W	1 EA	
5	BRKT-CRT	BH70-10476A	SECC T1.0	2 EA	
6	CRT SCREW	6006-000009	D5,L30	2 EA	
7	ASSY TAP. HOLDER	BH75-10618A	D5,L30	2 EA	
8	HEATSINK-VIDEO	BH62 30410B	A6063S	1 EA	
9	ASSY,SHIELD-CRT	BH75-10543A	SPTE T=0.3	1 EA	



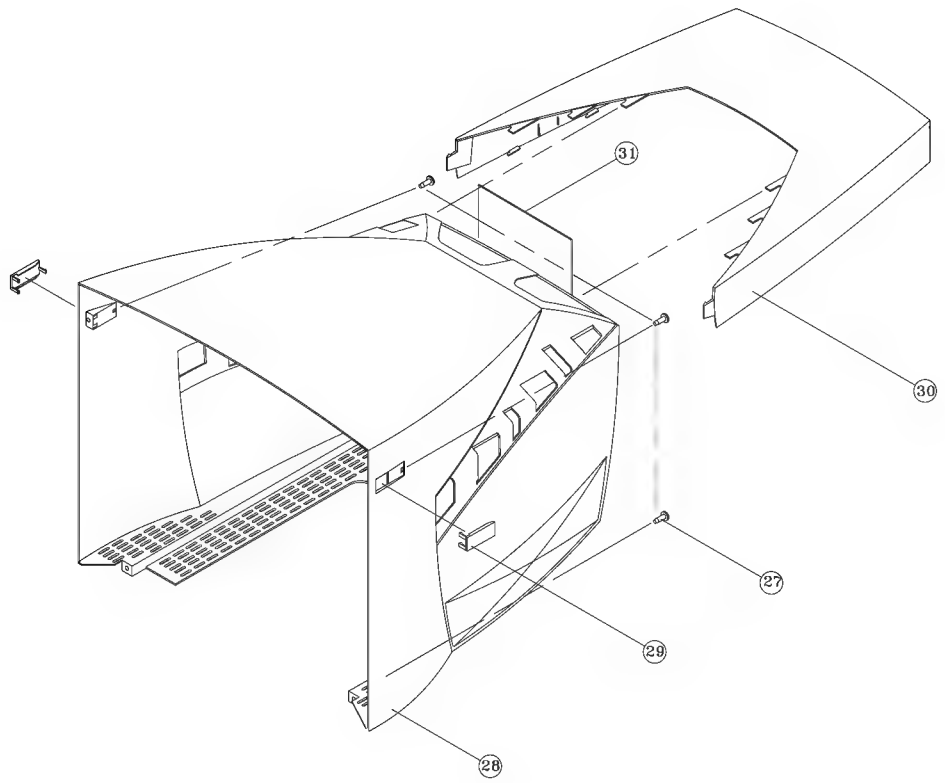
8-2 Chassis & Stand Ass'y

NO	DESCRITION	CODE NO	SPECIFICATION	Q'TY	REMARK
10	JNT FRAME	BH75 10614B	SECC T T 1.0	1 EA	
11	STAND ASSY	BH75-10459B	ABS HB V16	1 EA	
12	SHAFT POWER	BH72-60651A	PBT,WHT	1 EA	
13	SUPPORT POWER	BH61 30001A	ABS V0 V16	1 EA	
14	TAPTITE SCREW	6003-000009	BH,M4,.16	7 EA	
15	SPRING-PS	BH61-70003A	STS304-W1/2H,T0.5	6 EA	
16	HEATSINK VER. T C	BH62 30411A	A1050S T-2.0	1 EA	
17	HEATSINK-POWER	BH62-30411A	A1050S T-2.0	1 EA	
18	HEATSINK FBT	BH62-30417A	A1050S T=1.0	1 EA	
19	SHELD D.SUB	BH70 10345A	SPTE T0.5	1 EA	
20	BRKT G/SUB	BH70 10007A	SECC T T0.8	1 EA	
21	HEATS NK C	BH62 30411A	SPC-1,T1.0	1 EA	
22	NUT	6021 000118	M3,SM20C	2 EA	
23	HEATS NK-TR	BH62 30015A	SPC-1,T1.0	1 EA	
24	SCREW ASSY MACHINE	6006 001008	M3,L10	2 EA	
25	TAPT TE-SCREW	6003 000015	BH,M3,.8,ZPC	2 EA	
26	TAPT TE SCREW	6003-000010	M3,L10	6 EA	



8-3 Rear Cover Ass'y

NO	DESCRIPTION	CODE NO	SPECIFICATION	Q'TY	REMARK
1	TAPTITE SCREW	6003 000009	BH,M4,,16	4 EA	
2	COVER REAR	BH72 60460B	ABS V0 IV16	1 EA	
3	CAP SCREW	BH72 60448A	ABS V0 IV16	2 EA	
4	COVER TOP	BH72 60462A	ABS V0 IV16	1 EA	
5	LABEL RATING	BH68 30634A	POLYESTER T 0.075	1 EA	



Memo

9 Electrical Parts List

9-1 Main PCB Parts

Loc. No.	Coordinates (X,Y)		New Code No.	Description	Specification	Remarks
BD401	33.3	157	3301-000011	MAG-CORE,RERRITE,BEAD	1.2UH,3.5_5.7MM,10OHM	
BD402	185	195.5	3301-000011	MAG-CORE,RERRITE,BEAD	1.2UH,3.5_5.7MM,10OHM	
BD403	72.5	146.8	3301-000011	MAG-CORE,RERRITE,BEAD	1.2UH,3.5_5.7MM,10OHM	
BD406	162.8	205.5	3301-000011	MAG-CORE,RERRITE,BEAD	1.2UH,3.5_5.7MM,10OHM	⚠
BD603	222	46.5	3301-000011	MAG-CORE,RERRITE,BEAD	1.2UH,3.5_5.7MM,10OHM	
BD604	178.5	72	3301-000011	MAG-CORE,RERRITE,BEAD	1.2UH,3.5_5.7MM,10OHM	
BD605	289.5	68.3	3301-000011	MAG-CORE,RERRITE,BEAD	1.2UH,3.5_5.7MM,10OHM	⚠
BD608	305	53.5	3301-000011	MAG-CORE,RERRITE,BEAD	1.2UH,3.5_5.7MM,10OHM	
BD610	215.5	124.5	3301-000011	MAG-CORE,RERRITE,BEAD	1.2UH,3.5_5.7MM,10OHM	
BD611	222	42	3301-000011	MAG-CORE,RERRITE,BEAD	1.2UH,3.5_5.7MM,10OHM	⚠
C201	29	53.5	2401-001166	CAP-AL.ELEC,336M,1C	(T)16V 33M	
C202	36.3	40.5	2401-000027	C-AL	4.7uF,20%,50V,GP,5x11mm,5mm,TP	
C203	31	64.3	2201-000017	C-CERAMIC,DISC	1nF,10%,50V,Y5P,4x3.5,5,TP	
C204	31	68.8	2201-000146	C-CERAMIC,DISC	100pF,5%,50V,SL,5x3.5,5,TP	
C205	17.8	64.3	2401-000050	C-AL	100pF,5%,50V,SL,5x3.5,5,TP	
C207	25.3	35.5	2401-000050	C-AL	10uF,20%,16V,GP,5x11mm,2mm,TP	
C208	22	47	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C209	44.5	33.5	2401-000023	CAP-AL.ELEC,105M,1H	(T)50V 1M	
C210	74.5	53	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C211	74.5	48	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C212	81	63.8	2401-000023	CAP-AL.ELEC,105M,1H	(T)50V 1M	TILT
C213	38.5	28	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C214	77	17.3	2401-000050	C-AL	10uF,20%,16V,GP,5x11mm,2mm,TP	
C215	72	21.8	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C216	71	107.5	2401-000050	C-AL	10uF,20%,16V,GP,5x11mm,2mm,TP	
C217	65	108.5	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C219	286.8	133.5	2201-000011	C-CERAMIC,DISC	47pF,5%,50V,NPO,6.5x3.0,5,TP	
C220	77.8	84.8	2401-000050	C-AL	10uF,20%,16V,GP,5x11mm,2mm,TP	
C222	43	88	2401-000023	CAP-AL.ELEC,105M,1H	(T)50V 1M	
C301	110.5	90.5	2305-001009	C-FILM,MPEF	39nF,5%,250V,13x9x4.5mm,7.5mm	
C304	110.5	61.5	2401-000023	CAP-AL.ELEC,105M,1H	(T)50V 1M	
C305	132.5	64	2305-000280	CAP-MPETP,224K,1J,5P	(T)63V 224K	
C307	104	56	2401-000849	CAP-AL.ELEC,227M,1V	(T)35V 220M	
C309	102.8	71.5	2201-000013	C-CERAMIC,DISC	470pF,10%,50V,Y5P,4x3.5,5,TP	
C310	107.3	73.5	2301-000228	C-FILM,PEF	3.3nF,10%,100V,5.8x12.5mm,5mm	
C311	105	47.3	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C312	95.5	18.5	2305-000001	C-FILM,MPEF	470nF,10%,63V,6.0X15.5X7.5,5mm	TILT
C314	95.5	18.5	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C401	52	138.3	2401-000027	C-AL	4.7uF,20%,50V,GP,5x11mm,5mm,TP	
C402	32.5	140.5	2305-000280	C-FILM,MPEF	220nF,10%,63V,TP,7.5x13.5mm	
C403	52	130	2301-000015	C-FILM,PEF	10nF,5%,100V,7x3.2x7mm,5mm,TP	
C404	62.5	142.8	2401-000031	C-AL	47uF,20%,16V,GP,6.3x11mm,5mm,T	
C405	63.5	133.8	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C406	56.5	137	2301-000257	C-FILM,PEF	4.7nF,10%,100V,5.8x12.5mm,5mm	
C407	69	142.5	2201-000471	C-CERAMIC,DISC	330pF,10%,50V,Y5P,4x3.5,5,TP	⚠

Loc.No.	Coordinates (X,Y)		New Code No.	Description	Specification	Remarks
C408	43.8	138	2301-000016	C-FILM,PEF	22nF,5%,100V,7.2x4.5x9.0mm,5mm	
C409	53.3	142.8	2202-002021	C-CERAMIC,MLC-RADIAL	1nF,5%,50V,NPO,TP,5.1x6.4x3.2	
C410	100	218	2201-000105	C-CERAMIC,DISC	1.2nF,10%,500V,Y5P,8.5x5MM,5,TP	
C411	126.5	196.5	2305-000231	C-FILM,MPEF	1uF,10%,63V,7.5x15.5mm,5mm,TP	
C412	113.3	181.5	2301-000010	CAP-MYLAR,104J,2A,5P	(T)100V 104J	
C413	81.5	181	2201-000469	C-CERAMIC,DISC	330pF,10%,500V,Y5P,6x3.5,5,TP	
C414	158	224	2301-001169	C-FILM,PPF	1.8nF,5%,2.5KV,TP,22.5x20x12.5	⚠
C415	168	224	2301-001169	C-FILM,PPF	1.8nF,5%,2.5KV,TP,22.5x20x12.5	⚠
C416	69.8	220.8	2305-000179	C-FILM,MPEF	10nF,5%,250V,14.5x8.8mm,10mm,B	
C417	196.5	227	2301-000133	C-FILM,PEF	10nF,10%,100V,6.5x12.5mm,5mm,T	
C418	109	226.8	2303-000122	C-FILM,PPF	10nF,5%,630V,19x12.5mm,7.5mm,T	
C420	66.5	182.5	2301-000016	C-FILM,PEF	22nF,5%,100V,7.2x4.5x9.0mm,5mm	
C421	75	137.5	2201-000643	C-CERAMIC,DISC	680pF,10%,50V,Y5P,4x3.5,5,TP	
C422	50	213.5	2306-000164	C-FILM,MPPF	220nF,5%,250V,19x22x10,7.5mm,T	
C423	60.5	213.5	2306-000179	C-FILM,MPPF	300nF,5%,250V,21.5x13.5mm,7.5m	
C424	40.8	213.5	2306-000007	C-FILM,MPPF	470nF,5%,250V,26.5x14mm,22.5mm	
C425	32.5	161.5	2401-000042	C-AL	100uF,20%,16V,GP,6.3x7mm,2.5mm	
C426	32.5	161.5	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C427	61.8	167.5	2301-000168	C-FILM,PEF	150nF,5%,100V,11.5x19mm,7.5mm	
C428	25.8	229	2401-000023	CAP-AL.ELEC,105M,1H	(T)50V 1M	
C429	15.8	226.5	2401-000023	CAP-AL.ELEC,105M,1H	(T)50V 1M	
C430	61.8	161.5	2305-000001	C-FILM,MPEF	470nF,10%,63V,6.0X15.5X7.5,5mm	
C431	32.5	168.5	2401-000042	C-AL	100uF,20%,16V,GP,6.3x7mm,2.5mm	
C432	32.5	168.5	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C433	32.5	168.5	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C434	74.5	167.5	2401-001509	C-AL	47uF,20%,16V,GP,6.3x7mm,2.5mm	
C435	169.5	156	2401-001012	C-ALUMINUM	3.3UF,20%,50V,BP,16+26.7,7.5mm,T	
C436	162	180.5	2303-000260	C-FILM,PPF	5.6nF,5%,630V,19x7x13,7.5,TP	
C437	198.5	145	2301-000012	CAP-MYLAR,222J,2A,5P	(T)100V 222J	
C438	84	118.5	2305-000231	C-FILM,MPEF	1uF,10%,63V,7.5x15.5mm,5mm,TP	
C439	156.8	146.5	2201-000378	C-CERAMIC,DISC	220pF,5%,50V,Y5P,4x4,5,TP	
C440	76	132	2301-000016	C-FILM,PEF	22nF,5%,100V,7.2x4.5x9.0mm,5mm	
C441	183.8	124.3	2301-000012	CAP-MYLAR,222J,2A,5P	(T)100V 222J	
C442	148.8	146.5	2201-000326	C-CERAMIC,DISC	2.2nF,10%,50V,Y5P,6.3X3.0,5,TP	
C443	36.8	140.5	2301-000016	C-FILM,PEF	22nF,5%,100V,7.2x4.5x9.0mm,5mm	
C445	51.5	163	2401-000050	C-AL	10uF,20%,16V,GP,5x11mm,2mm,TP	
C447	50.5	179.5	2401-000023	CAP-AL.ELEC,105M,1H	(T)50V 1M	
C450	50.5	179.5	2201-000012	C-CERAMIC,MLC-AXIAL	220PF,10%,1KV,Y5P,6X5MM,5MM	
C502	96	159.8	2401-000966	C-AL	22uF,20%,50V,GP,6.3x11mm,5mm,T	
C504	107.5	127.5	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C505	168.3	127.3	2305-000004	C-FILM,MPEF	220nF,10%,100V,12.7x16,5mm,TP	
C507	289.8	196	2201-000017	C-CERAMIC,DISC	1nF,10%,50V,Y5P,4x3.5,5,TP	
C508	281.5	159.5	2401-002264	CAP-AL.ELEC,106M,2E	(T)350V 10M	
C509	287	224.8	2301-000018	C-FILM,PEF	47nF,5%,100V,8.5x12.5mm,5mm,TP	
C510	163	137.8	2301-000012	CAP-MYLAR,222J,2A,5P	(T)100V 222J	
C511	129.5	143	2201-000469	C-CERAMIC,DISC	330pF,10%,500V,Y5P,6x3.5,5,TP	
C512	152.8	161.5	2306-000007	C-FILM,MPPF	470nF,5%,250V,26.5x14mm,22.5mm	

Loc. No.	Coordinates (X,Y)		New Code No.	Description	Specification	Remarks
C514	206.5	127	2201-000010	C-CERAMIC,DISC	33pF,5% ,50V,NPO,5x3.5,5,TP	
C515	201	125.5	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20% ,50V,Y5V,2.3X3.0	
C516	181.8	133.3	2401-002299	C-AL	4.7uF,20% ,50V,GP,5x7,5,TP	
C517	138.3	85.8	2401-000373	C-AL	100uF,20% ,63V,GP,10x20mm,5mm,T	
C518	168.8	134.5	2401-000031	C-AL	47uF,20% ,16V,GP,6.3x11mm,5mm,T	
C519	294	175	2401-000010	C-AL	220uF,20% ,16V,GP,6.3x11mm,2.5m	
C520	284.5	213.5	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20% ,50V,Y5V,2.3X3.0	
C601	68.5	11	2401-000037	CAP-AL.ELEC,477M	(T)470UF,16V,20% ,R-RADIAL,1C,8x11.5	
C602	68.5	11	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20% ,50V,Y5V,2.3X3.0	
C604	291	72	2201-000024	C-CERAMIC,DISC	4.7nF,20% ,250VAC,Y5U,16x7,7.5	⚠
C605	276.5	72	2201-000024	C-CERAMIC,DISC	4.7nF,20% ,250VAC,Y5U,16x7,7.5	⚠
C606	274	61	2501-000203	CAP-MPAPER,474K,250VAC	470NF,250VAC,10% ,X2,RE-RAD,25.4	⚠
C607	279	39	2201-000024	C-CERAMIC,DISC	4.7nF,20% ,250VAC,Y5U,16x7,7.5	⚠
C608	300.8	46.5	2201-000024	C-CERAMIC,DISC	4.7nF,20% ,250VAC,Y5U,16x7,7.5	⚠
C610	184.5	14	2301-000012	CAP-MYLAR,222J ,2A,5P	(T)100V 222J	
C611	172.5	21.8	2301-000287	CAP-MYLAR,562J ,2A,5P	(T)100V 562J	
C612	144.5	58.5	2401-000373	C-AL	100uF,20% ,63V,GP,10x20mm,5mm,T	
C613	254.3	55.8	2301-000018	C-FILM ,PEF	47nF,5% ,100V,8.5x12.5mm,5mm,TP	
C615	163	22	2401-000039	CAP-AL.ELEC,108M	(T)1000UF,16V,20% ,1C,10x16,R-RADIAL	
C616	163	22	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20% ,50V,Y5V,2.3X3.0	
C617	247	101	2401-000052	CAP-AL.ELE,227M	(B)220UF,400V,20% ,2G,30X35,R-RADIAL,TERM	⚠
C618	243	35.8	2201-000019	C-CERAMIC,DISC	10nF,+80-20% ,500V,Y5V,10x4,5,T	
C619	243	35.8	2201-000016	C-CERAMIC,DISC	10nF,+80-20% ,500V,Y5V,10x4,5,T	
C620	147	41.5	2401-000033	C-AL	100uF,20% ,100V,GP,13x20mm,5mm	
C621	170.8	64	2201-000440	C-CERAMIC,DISC	3.3nF,10% ,500V,Y5P,10x4,5,BK	
C622	196	90.5	2401-000151	CAP-AL.ELEC,108M .1E	(T)1000UF,35V,20% ,12.5x20,R-RADIAL	M/M
C623	248	64.5	2401-001195	CAP-AL.ELEC,336M ,1H	(T)50V 33M	
C625	243	41.3	2201-000012	C-CERAMIC,DISC	220pF,10% ,1KV,Y5P,6.3x5,5,TP	
C626	224	70	2401-000023	CAP-AL.ELEC,105M ,1H	(T)50V 1M	
C627	165.5	37.5	2401-000039	CAP-AL.ELEC,108M .1C	(T)1000UF,16V,20% ,10x16,R-RADIAL	
C628	25	173	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20% ,50V,Y5V,2.3X3.0	
C629	36	192.5	2401-000042	C-AL	100uF,20% ,16V,GP,6.3x7mm,2.5mm	
C630	208.8	70.3	2201-000313	C-CERAMIC,DISC	2.2nF,+80-20% ,250VAC,Y5U,9x5,7	
C631	274	9.3	2201-000313	C-CERAMIC,DISC	2.2nF,+80-20% ,250VAC,Y5U,9x5,7	
C632	165	47.5	2401-000039	CAP-AL.ELEC,108M .1C	(T)1000UF,16V,20% ,10x16,R-RADIAL	
C633	171.3	74.5	2401-000031	C-AL	47uF,20% ,16V,GP,6.3x11mm,5mm,T	
C634	215.5	80.3	2301-000010	CAP-MYLAR,104J ,2A,5P	(T)100V 104J	
C635	26.5	193.5	2401-001166	CAP-AL.ELEC,336M ,1C	(T)16V 33M	
C637	124.5	12	2401-000037	CAP-AL.ELEC,477M ,1C	(T)470UF,16V,20% ,8x11.5,R-RADIAL	
C639	314.5	122.3	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20% ,50V,Y5V,2.3X3.0	M/M
CF201			BH39-40359H	CBF-HARNESS	10P,200MM ,BLU/WHT,UL1007,AWG26	
CN1	317	189	3711-003230	CONNECTOR-HEADER	BOX,3P,1R,2mm,ANGLE,SN	
CN2	323	202.5	3711-003456	CONNECTOR-HEADER	BOX,7P,1R,2mm,ANGLE,SN	
CN200	316	144	3701-000003	CONNECTOR-DSUB	15P,3R,FEMALE,ANGLE,AUF	
CN202	305	147	3711-003240	CONNECTOR-HEADER	BOX,15P,1R,2.5mm,STRAIGHT,SN	
CN203	7	24	3711-003052	CONNECTOR-HEADER	BOX,10P,1R,2.5MM ,STRAIGH,SN	
CN301	143.8	184.5	BH71-40300A	PIN-HINGE	BRASS,D2.36,SN,HEAT/SINK	

Loc. No.	Coordinates (X,Y)		New Code No.	Description	Specification	Remarks
CN302	143.8	176.5	BH71-40300A	PIN-HINGE	BRASS,D2.36,SN,HEAT/SINK	
CN303	95	12.5	3711-000197	CONNECTOR-HEADER	1WALL,3P,1R,2.5mm,STRAIGHT,SN	TILT
CN502	143.8	202.5	BH71-40300A	PIN-HINGE	BRASS,D2.36,SN,HEAT/SINK	
CN503	143.8	192.5	BH71-40300A	PIN-HINGE	BRASS,D2.36,SN,HEAT/SINK	
CN504	276	238.3	3711-000024	CONNECTOR-HEADER	BOX,3P,1R,2.5mm,STRAIGHT,SN	TCO
CN601	307	82	3711-000217	CON-WALL HEADER,3P,3.96	STRAIGHT,1WALL	⚠
CN602	274	101.8	3711-000178	CONNECTOR-HEADER	1WALL,2P,1R,3.96mm,STRAIGHT,SN	TCO
CN603	266	100.5	BH71-40300A	PIN-HINGE	BRASS,D2.36,SN,HEAT/SINK	
CN604	266	93	BH71-40300A	PIN-HINGE	BRASS,D2.36,SN,HEAT/SINK	
CN605	320	101.3	3722-000110	CON-MINIATURE JACK	4P,8.6X8X12.7MM	M/M
D201	293	139	0403-000005	0.5W,10MA	DIODE-ZEN,UZ-5.1B,DO-35	
D202	290.5	139	0403-000005	0.5W,10MA	DIODE-ZEN,UZ-5.1B,DO-35	
D203	13.5	10.3	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D205	301	158	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D206	298.5	158	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D207	291	158	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D208	303.5	166	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D209	296	169	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D210	293.5	169	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D211	309.5	137.8	0403-000005	0.5W,10MA	DIODE-ZEN,UZ-5.1B,DO-35	
D212	28	28	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D213	71.5	32	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D214	309.5	129.3	0403-000005	0.5W,10MA	DIODE-ZEN,UZ-5.1B,DO-35	
D215	309.5	135.3	0403-000005	0.5W,10MA	DIODE-ZEN,UZ-5.1B,DO-35	
D216	66.5	133.8	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D217	88.5	13.5	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D301	131	40.5	0402-000128	70V,1A,1.1V,1A,2000NS,0.5A	DIODE-REC,1N4002,DO-41	
D302	120	37	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D401	103.5	223	0402-000007	420V,1A,1.2V,1A,200NS,1A	DIODE-REC,1N4937,DO-41	
D402	79	222	0401-000006	DIODE-SWITCHING	BAV21,200V,250mA,400mW,50nS,DO	
D403	186.5	207.8	0402-001174	DIODE-RECTIFIER	YG121S15,1500V,5A,TO-220,ST	⚠
D404	75	226.5	0401-000006	DIODE-SWITCHING	BAV21,200V,250mA,400mW,50nS,DO	
D405	134	201	0402-000128	70V,1A,1.1V,1A,2000NS,0.5A	DIODE-REC,1N4002,DO-41	
D406	31.3	208	0402-000006	DIODE-RECTIFIER	1N4007GP,1000V,1A,DO-41	
D407	19.8	208	0402-000006	DIODE-RECTIFIER	1N4007GP,1000V,1A,DO-41	
D408	173.5	186	0402-001112	DIODE-RECTIFIER	MDV04-600,600V,4A,DO201,BK	
D409	178.5	232.5	0402-001025	DIODE-RECTIFIER	ERD07-15,1500V,1.5A	
D410	40.5	140.5	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D411	69.3	197.8	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D412	61	133.8	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D413	58.5	125.8	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D414	170	191.5	0402-000546	DIODE-RECTIFIER	TVR10G,400V,1.0A,DO-41	
D416	115	235.3	0402-000007	420V,1A,1.2V,1A,200NS,1A	DIODE-REC,1N4937,DO-41	
D501	151	122.5	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D503	186.8	129.3	0401-000006	DIODE-SWITCHING	BAV21,200V,250mA,400mW,50nS,DO	
D507	181.3	114	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D509	181.3	116.5	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	

Loc. No.	Coordinates (X,Y)		New Code No.	Description	Specification	Remarks
D510	262.5	172.3	0402-000546	DIODE-RECTIFIER	TVR10G,400V,1.0A,DO-41	
D511	164	118.5	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D512	120	158	0403-000004	DIODE-ZENER	UZ12BM,12V,11.6-12.4V,500mW,DO	
D513	236	135.5	0401-000006	DIODE-SWITCHING	BAV21,200V,250mA,400mW,50nS,DO	
D514	262.5	238.3	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D515	129.5	155.8	0402-001118	DIODE-RECTIFIER	UF1G,400V,1.2A,DO-204AL,TP	
D516	196	125.5	0401-000005	DIODE-SIG,1N4148,DO-35	75V,150MA,1V,10MA	
D518	266.5	225.5	0401-000005	DIODE-SIG,1N4148,DO-35	75V,150MA,1V,10MA	
D519	133	120	0403-000753	DIODE-ZENER	MTZJ 27D,27V,25.7-28.0V,500mW,DO	
D602	285	123.5	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D604	273	87.5	0402-001111	DIODE-RECTIFIER	1N5397GP,600V,1.5A,DO-204AC,TP	⚠
D605	256.5	66	0402-001111	DIODE-RECTIFIER	1N5397GP,600V,1.5A,DO-204AC,TP	⚠
D606	254.5	81	0402-001111	DIODE-RECTIFIER	1N5397GP,600V,1.5A,DO-204AC,TP	⚠
D607	270.5	76	0402-001111	DIODE-RECTIFIER	1N5397GP,600V,1.5A,DO-204AC,TP	⚠
D608	171	28.5	0402-000546	DIODE-RECTIFIER	TVR10G,400V,1.0A,DO-41	
D611	186	33.5	0402-000012	DIODE-RECTIFIER	UF4007,1KV,1A,DO-41	
D612	186.5	70.5	0402-000016	DIODE-RECTIFIER	UF5404,400V,3A,DO-201AD	M/M
D613	232.5	38	0402-000007	420V,1A,1.2V,1A,200NS,1A	DIODE-REC,1N4937,DO-41	
D614	222	56.5	0402-000546	DIODE-RECTIFIER	TVR10G,400V,1.0A,DO-41	
D615	186.5	59.5	0402-000005	DIODE-RECTIFIER	31DF4,400V,3A,DO-201AD	
D616	186	38.5	0402-001118	DIODE-RECTIFIER	UF1G,400V,1.2A,DO-204AL,TP	
D617	186	43.5	0402-000274	DIODE-RECTIFIER	UF4004,400V,1A,DO-41	
D618	209.5	73.5	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D619	256	41.3	0402-000007	420V,1A,1.2V,1A,200NS,1A	DIODE-REC,1N4937,DO-41	
D620	175.5	64	0402-000546	DIODE-RECTIFIER	TVR10G,400V,1.0A,DO-41	
D621	24	187.5	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D622	21	187.5	0403-000361	DIODE-ZENER	UZ6.2BSB,6.2V,5.99-6.24V,500mW	
D623	22	200.5	0403-000361	DIODE-ZENER	UZ6.2BSB,6.2V,5.99-6.24V,500mW	
D624	146	71.8	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
FG601			3601-000004	FUSE-FERRULE	250V,3.15A,SLOW BLOW,CERAMI	
FH601	274	29.5	3602-000001	800GF,400-800GF	FUSE-CLIP,5.2X20,30M OHM	⚠
HS200	330	148.5	BH70-10345A	H/SINK-IMP	HEAT-SINK,IMP,SHILED-DSUB	
HS301	120	47	BH62-30411A	HEAT/SINK-FBT	A1050S,T1.0,CKA4227/CAK5227	
HS508	116.7	162	BH62-30015A	HEAT/SINK-TR	SCP-1,T1,SN,CVM 4967,3111	
HS602	238.6	52.5	BH62-30411A	IC-MICROPROCESSOR	68HC705,8BIT,DIP,42P,600MIL,4.	⚠
IC202			BH09-10304C	IC-MICROPROCESSOR	LSC442877B	⚠
IC203	82	24.3	1103-001020	IC-EEPROM	24LC04,4Kx8BIT,DIP,8P,300MIL	
IC204	64	121	1103-001009	IC-EEPROM	24LC21,128X8BIT,DIP,8P,300MIL	⚠
IC301	112	50.8	1204-000013	IC-VERTICAL PROCESSO	TDA9302H,TO-220,9P,PLASTIC,3	⚠
IC302	94.5	25	1201-001034	IC-AMPLIFIER	L272M,DIP,8P,28V,1A,1W,STICK	TILT
IC401	40	146.8	1204-001231	IC-DEF. PROCESSOR	TDA9109,DIP,32P,300MIL,PLASTIC	⚠
IC601	171	8.5	1203-000002	TO-92,3,36V(T)-SIMPLE	IC-LIN,431,REGULATOR	
IC602	247	46.5	BH13-10335J	IC-HYBRID	CKA5227,KA2S0680,SIP,5P,FET+CO	
IC603	87	9.5	1203-000001	IC-POSI.ADJUST REG.	7805,TO-220,3P,PLASTIC,4.8/5	
IS601	313.3	38.4	3721-001006	PLUG-AC POWER	3P,10/24mm,SN	⚠
L401	95	218	BH27-20344T	COIL-HORLINEARITY	8.6UH,20%,DR14*15,BULK	
L402	162.5	173.8	BH27-20343L	COIL-CHOKE	170UH,10%,DR14*20,BULK	

Loc.No.	Coordinates (X,Y)		New Code No.	Description	Specification	Remarks
L403	43.8	120	2701-000154	INDUCTOR-AXIAL	220uH,10%,4.2x9.8mm	
L501	129	137	BH27-20310H	COIL-CHOKE	0.18OHM,16.7*27.8,B,USTC0.	
L502	81	205	BH27-20342U	COIL-CHOKE	7.1MH,10%,DR8*11,BULK	
L601	279	78	BH27-20022A	COIL-LINE FILTER	0.3OHM,-,B,1UEW0.40,5T,3	⚠
L602	283.5	51.5	BH26-30008A	TRANS-LINE FILTER	15MH,8P,EE,SB-5S,15MH,EE-222	⚠
OP1	308.3	194	0601-001047	LED	ROUND,GRN/YEL,2mm,585nm	
OP601	200	17.5	0604-001018	PHOTO-COUPLER	DAR-TR,63-125%,200mW,DIP-4,ST	⚠
Q201	31	35.5	0501-000586	TR-NPN,KSC945,TO-92,EBC	0.25W,60V,50V,5V,0.15A	
Q202	70.5	120	0501-000122	TR-NPN,2N3904,TO-92,EBC	0.625W,60V,40V,6V,0.2A	
Q203	37	88	0501-000303	TR-SMALL SIGNAL	KSA733-Y,PNP,250mW,TO-92,120	
Q205	9	51.3	0501-000586	TR-NPN,KSC945,TO-92,EBC	0.25W,60V,50V,5V,0.15A	
Q301	102	85.8	0501-000586	TR-NPN,KSC945,TO-92,EBC	0.25W,60V,50V,5V,0.15A	
Q402	185.3	174.3	0502-001113	TR-POWER	TS7988,NPN,70W,TO-3PF,ST,15-30	
Q403	80.3	195.8	0502-000429	TR-POWER	KSC3503-D,NPN,1.2W,TO-126,ST,6	
Q404	33	229	0505-000011	FET-N,IRF630,TO-220,GDS	75W,200V,9A	
Q405	18.8	229	0505-001102	FET-SILICON	IRFR/U230A,N,200V,7.5A,400mohm	
Q406	50.5	193	0501-000586	TR-NPN,KSC945,TO-92,EBC	0.25W,60V,50V,5V,0.15A	
Q407	65.5	193	0501-000586	TR-NPN,KSC945,TO-92,EBC	0.25W,60V,50V,5V,0.15A	
Q408	154.3	137.3	0501-000303	TR-SMALL SIGNAL	KSA733-Y,PNP,250mW,TO-92,120	
Q409	146.8	142.3	0501-000303	TR-SMALL SIGNAL	KSA733-Y,PNP,250mW,TO-92,120	
Q410	222.8	148.8	0503-000001	TR-DARLINGTON	KSE800,NPN,60V,60V,4A,40W,TO-126	
Q501	284.5	231.8	0501-000586	TR-NPN,KSC945,TO-92,EBC	0.25W,60V,50V,5V,0.15A	
Q502	284.5	216.8	0501-000586	TR-NPN,KSC945,TO-92,EBC	0.25W,60V,50V,5V,0.15A	
Q504	164.5	128	0501-000143	TR-SMALL SIGNAL	2N6520,PNP,625mW,TO-92,30-20	
Q506	284.5	204.5	0501-000303	TR-SMALL SIGNAL	KSA733-Y,PNP,250mW,TO-92,120	
Q507	92	168.5	0501-000586	TR-NPN,KSC945,TO-92,EBC	0.25W,60V,50V,5V,0.15A	
Q508	112.8	164.5	0505-000011	FET-N,IRF630,TO-220,GDS	75W,200V,9A	
Q509	97.5	168.5	0501-000303	TR-SMALL SIGNAL	KSA733-Y,PNP,250mW,TO-92,120	
Q510	215.5	128.5	0501-000492	TR-SMALL SIGNAL	MPS3646,NPN,625mW,TO-92,30-1	
Q601	259.5	121.3	0501-000586	TR-NPN,KSC945,TO-92,EBC	0.25W,60V,50V,5V,0.15A	
Q602	40	182	0501-000586	TR-NPN,KSC945,TO-92,EBC	0.25W,60V,50V,5V,0.15A	
Q603	163.3	71.8	0501-000321	TR-SMALL SIGNAL	KSB1116-Y,PNP,0.75W,TO-92,13	
Q604	98.8	62	0501-000586	TR-NPN,KSC945,TO-92,EBC	0.25W,60V,50V,5V,0.15A	
Q605	32.5	176	0501-000321	TR-SMALL SIGNAL	KSB1116-Y,PNP,0.75W,TO-92,13	
Q606	30	190	0501-000586	TR-NPN,KSC945,TO-92,EBC	0.25W,60V,50V,5V,0.15A	
Q607	132.5	10.5	0501-000321	TR-SMALL SIGNAL	KSB1116-Y,PNP,0.75W,TO-92,13	
Q611	301	117.8	0501-000586	TR-NPN,KSC945,TO-92,EBC	0.25W,60V,50V,5V,0.15A	M/M
Q612	311	122.8	0501-000321	TR-SMALL SIGNAL	KSB1116-Y,PNP,0.75W,TO-92,13	M/M
R201	69	32	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R202	66.5	32	2001-000077	R-CARBON	47Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R203	36	28	2001-000051	R-CARBON	2.7Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R205	61.5	32	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R206	59	32	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R208	43.5	14	2001-000072	R-CARBON	22Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R210	38.3	44.3	2001-001070	R-CARBON(S)	120ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R213	34.3	68	2001-000029	R-CARBON	100ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R214	36.8	68	2001-000029	R-CARBON	100ohm,5%,1/6W,AA,TP,1.8x3.2mm	

Loc. No.	Coordinates (X,Y)		New Code No.	Description	Specification	Remarks
R215	22	49.5	2001-000108	R-CARBON	18Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R216	82	73.3	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	TILT
R217	29	32	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R218	30.5	14	2001-000224	R-CARBON	1.2M ohm,5%,1/6W,AA,TP,1.8x3.2m	
R219	42.8	68	2001-000029	R-CARBON	100ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R220	51	40	2001-000097	R-CARBON	1M ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R221	54	32	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R222	56.5	32	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R223	63.5	68	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R224	66	68	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R225	46	28	2001-000077	R-CARBON	47Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R226	25	98.5	2001-000028	R-CARBON(S)	100ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R227	25	101	2001-000077	R-CARBON	47Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R228	25	103.5	2001-000077	R-CARBON	47Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R230	60	108.5	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R231	52.3	15	2001-000053	R-CARBON	3.3Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R232	54.8	15	2001-000053	R-CARBON	3.3Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R233	73.5	11.8	2001-000029	R-CARBON	100ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R234	54	108.5	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R235	68.5	25.5	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R236	56.5	108.5	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R238	68.5	28	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R239	77.3	81	2001-000050	R-CARBON	2.7Kohm,5%,1/4W,AA,TP,2.4x6.4m	
R240	62.5	108.5	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R241	25	120	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R242	25	115	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R243	25	108.5	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R244	25	93	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R245	37	117.5	2001-000106	R-CARBON	1.5Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R246	37	112.5	2001-000106	R-CARBON	1.5Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R247	37	106	2001-000106	R-CARBON	1.5Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R248	37	95.5	2001-000106	R-CARBON	1.5Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R249	21.5	117.5	2001-000889	REF-CF,6.8K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R250	21.5	108.5	2001-000889	REF-CF,6.8K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R251	21.5	104.8	2001-000889	REF-CF,6.8K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R252	21.5	91	2001-000889	REF-CF,6.8K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R253	12.5	123.5	2001-000367	R-CARBON	15Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R254	12.5	137.5	2001-000367	R-CARBON	15Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R256	86.5	55.5	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R257	295.5	130	2001-000553	R-CARBON	270ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R258	94	94.5	2001-000553	R-CARBON	270ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R259	94	92	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R260	94	97	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R262	40.3	68	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R266	40.5	114.5	2001-000048	REF-CF,2.2K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R269	19.5	72	2001-000889	REF-CF,6.8K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R270	46	68	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	

Loc. No.	Coordinates (X,Y)		New Code No.	Description	Specification	Remarks
R271	309.5	131.8	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R282	64	32	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R283	71	18.3	2001-001088	R-CARBON(S)	1Kohm,5%,1/2W,AA,TP,2.4x6.4mm	
R284	58.5	21.3	2001-001088	R-CARBON(S)	1Kohm,5%,1/2W,AA,TP,2.4x6.4mm	
R285	10.5	13	2001-000488	REF-CF,200,5%,1/4W	250V,-350 TO +350PPM/C,R-AXIAL	
R286	21.5	18	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R287	21.5	20.5	2001-000083	R-CARBON	82Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R288	10.5	23	2001-000075	R-CARBON	39Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R289	21.5	15.5	2001-000079	R-CARBON	56Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R301	114.3	84.3	2001-000108	R-CARBON	18Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R302	94.3	88.5	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R305	93.8	79.5	2001-000059	REF-CF,5.6K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R306	93.8	65.5	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R309	129	45	2001-000245	REF-CF,1.5,5%,1/2W	350V,-350 TO +350PPM/C,R-AXIAL	
R310	128.8	75.8	2001-000425	R-CARBON	1Kohm,5%,1/2W,AA,TP,3.3x9mm	
R311	120.3	65.5	2004-001022	REF-MF,5.6K,1%,1/4W	250V,-100 TO +100PPM/C,R-AXIAL	
R312	125	90.8	2003-000422	R-METAL OXIDE(S)	1.2ohm,5%,2W,AA,TP,4x12mm	
R313	103.5	68.5	2004-000284	R-METAL	12Kohm,5%,1/4W,AA,TP,1.8x3.2mm	
R314	108	47.3	2004-000150	R-METAL	1.5Kohm,1%,1/4W,AA,TP,2.4x6.4m	
R315	102	47	2004-001329	R-METAL	9.1Kohm,1%,1/4W,AA,TP,2.4x6.4m	
R316	90	20	2001-000075	R-CARBON	39Kohm,5%,1/6W,AA,TP,1.8x3.2mm	TILT
R317	87.5	40	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	TILT
R318	105.5	32	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	TILT
R319	90	31	2001-000064	R-CARBON	7.5Kohm,5%,1/6W,AA,TP,1.8x3.2m	TILT
R320	104	17	2003-000807	R-METAL OXIDE(S)	82ohm,5%,2W,AA,TP,4x12mm	TILT
R321	87.5	27	2001-000083	R-CARBON	82Kohm,5%,1/6W,AA,TP,1.8x3.2mm	TILT
R322	117	90.8	2001-000073	R-CARBON	33Kohm,5%,1/4W,AA,TP,2.4x6.4mm	
R401	186.8	126.8	2001-000072	R-CARBON	22Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R403	28.5	144.5	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R404	28.5	147	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R405	71.8	143	2001-000097	R-CARBON	1M ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R406	47.5	128.5	2004-001136	R-METAL	6.8Kohm,1%,1/4W,AA,TP,2.4x6.4m	
R407	81	137.5	2001-000106	R-CARBON	1.5Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R408	55.8	133.8	2001-000106	R-CARBON	1.5Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R409	44.5	162.5	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R410	106.5	155.3	2003-000653	R-METAL OXIDE(S)	330ohm,5%,3W,AA,TP,6x16mm	
R411	86.8	180	2003-000512	R-METAL OXIDE(S)	15Kohm,5%,3W,AA,TP,6x16mm	
R412	74.5	211	2001-000020	REF-CF,22,5%,1/2W(S)	300V,-200 TO +200PPM/C,R-AXIAL	
R413	184.5	217.5	2003-000006	R-METAL OXIDE	47ohm,5%,1W,AA,TP,4.3x12mm	
R414	119	204.5	2003-000407	R-METAL OXIDE(S)	0.6ohm,5%,2W,AA,TP,4x12mm	
R415	190.5	216.5	2001-000525	R-CARBON	22ohm,5%,1/4W,AA,TP,2.4x6.4mm	
R416	84	229	2003-000500	R-METAL OXIDE(S)	150ohm,5%,1W,AA,TP,3.3x9mm	
R417	75.3	196	2003-000793	R-METAL OXIDE(S)	8.2Kohm,5%,2W,AA,TP,4x12mm	
R418	69.3	181	2001-000404	R-CARBON	180ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R419	71.8	189.8	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R420	59	178.5	2001-000048	REF-CF,2.2K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R421	56.5	178.5	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	

Loc. No.	Coordinates (X,Y)		New Code No.	Description	Specification	Remarks
R422	35.3	223	2001-000097	R-CARBON	1M ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R423	23.8	223	2001-000097	R-CARBON	1M ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R424	54	178.5	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R425	61.5	178.5	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R427	27.3	223	2001-000076	REF-CF,47K,5%,1/4W	250V,-600 TO -150PPM/C,R-AXIAL	
R428	15.8	223	2001-000076	REF-CF,47K,5%,1/4W	250V,-600 TO -150PPM/C,R-AXIAL	
R430	150.8	128.8	2001-000721	R-CARBON	4.3Kohm,5%,1/4W,AA,TP,2.4x6.4m	
R431	159.5	156.5	2001-000963	R-CARBON	75Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R432	80.5	119.3	2001-000090	R-CARBON	180Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R433	80.5	122	2001-000086	R-CARBON	100Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R434	157.5	100.5	2001-000889	REF-CF,6.8K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R435	230.5	149	2001-000053	R-CARBON	3.3Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R437	55.5	161.5	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R438	74	115	2001-000088	R-CARBON	120Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R439	19.5	85.5	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R440	19.5	88	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R441	47	114.5	2001-000367	R-CARBON	15Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R442	78	142.3	2001-000089	R-CARBON	150Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R443	74	155.8	2001-000547	R-CARBON	270Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R444	276.3	179	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R445	98	132.5	2001-000106	R-CARBON	1.5Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R448	165.5	191.5	2001-000246	R-CARBON	1.5ohm,5%,1/4W,AA,TP,2.4x6.4mm	
R502	92.5	152	2001-000069	R-CARBON	12Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R503	79	170	2001-000079	R-CARBON	56Kohm,5%,1/6W,AA,TP,1.8x3.2mm	⚠
R504	289.5	220.8	2001-000072	R-CARBON	22Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R505	284.5	228.8	2001-000104	R-CARBON	1.2Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R506	107.5	133.5	2004-000216	R-METAL	10Kohm,1%,1/4W,AA,TP,2.4x6.4mm	⚠
R507	81	140.5	2001-000075	R-CARBON	39Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R508	133	117.5	2004-000284	R-METAL	12Kohm,1%,1/4W,AA,TP,2.4x6.4mm	⚠
R509	107.5	130.5	2004-000458	R-METAL	2.2Kohm,1%,1/4W,AA,TP,2.4x6.4mm	⚠
R510	260	225.3	2001-000836	R-CARBON	51Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R511	291	208.5	2001-000057	REF-CF,5.1K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R512	273.8	179	2001-000093	R-CARBON	470Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R513	266.8	157.8	2008-000106	R-FUSIBLE	0.56ohm,5%,1/2W,AA,TP,3.5x9.4m	
R514	173.5	161	2001-000085	R-CARBON(S)	100Kohm,5%,1/2W,AA,TP,2.4x6.4m	
R515	182	121.3	2001-000047	R-CARBON	2.2Kohm,5%,1/4W,AA,TP,2.4x6.4m	
R516	289.8	179	2001-000547	R-CARBON	270Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R518	283.5	199	2001-000090	R-CARBON	180Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R519	91	177.3	2001-000058	R-CARBON	5.6Kohm,5%,1/4W,AA,TP,2.4x6.4m	
R520	178	137.5	2001-000115	R-CARBON	82Kohm,5%,1/4W,AA,TP,2.4x6.4mm	
R521	266	145	2001-001106	R-CARBON(S)	220Kohm,5%,1/2W,AA,TP,2.4x6.4m	
R522	266	152.5	2001-000096	R-CARBON(S)	1M ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R523	284.5	211	2001-000688	R-CARBON	390Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R524	284.5	201.5	2001-000106	R-CARBON	1.5Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R525	236	133	2001-000100	R-CARBON	2.2M ohm,5%,1/6W,AA,TP,1.8x3.2m	
R526	160	107.5	2001-000097	R-CARBON	1M ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R527	111	168	2001-000495	R-CARBON	20Kohm,5%,1/4W,AA,TP,2.4x6.4mm	

Loc. No.	Coordinates (X,Y)		New Code No.	Description	Specification	Remarks
R528	152.8	168.5	2003-000007	REF-M O,82,5%,3W(S)	350V,-350 TO +350PPM/C,R-AXIAL	
R529	95.5	165	2001-000110	REF-CF,10,5%,1/4W	250V,-350 TO +350PPM/C,R-AXIAL	
R530	101.5	138.5	2005-000401	R-WIRE WOUND	0.47ohm,5%,2W,AA,TP,4x12mm	
R531	121.5	147.5	2003-000386	REF-M O,910,5%,2W	350V,-200 TO +200PPM/C,R-AXIAL	
R532	287.3	179	2001-000089	R-CARBON	150Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R534	74	158.3	2001-000097	R-CARBON	1M ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R536	198.5	133.5	2001-000043	R-CARBON	1Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R538	203.5	125.5	2001-000877	R-CARBON	6.2Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R539	212	125.5	2001-000069	R-CARBON	12Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R540	209.5	125.5	2001-000064	R-CARBON	7.5Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R542	240	133	2001-000064	R-CARBON	7.5Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R543	168.3	130.5	2001-000074	R-CARBON	33Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R545	168.3	124	2001-003105	R-CARBON	1ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R547	135.3	212.5	2003-000656	R-M ETAL OXIDE(S)	33Kohm,5%,3W,AA,TP,6x16mm	
R602	259.5	117.8	2001-000027	R-CARBON	100ohm,5%,1/4W,AA,TP,2.4x6.4mm	
R603	75.5	58	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R605	177.5	8	2004-000979	R-M ETAL	47Kohm,1%,1/4W,AA,TP,2.4x6.4mm	⚠
R606	197	14	2001-000106	R-CARBON	1.5Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R607	174	8	2001-000889	REF-CF,6.8K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	⚠
R609	181.3	8	2004-000498	R-M ETAL	2.7Kohm,1%,1/4W,AA,TP,2.4x6.4m	⚠
R611	157.5	89.5	2003-000006	R-M ETAL OXIDE	47ohm,5%,1W,AA,TP,4.3x12mm	
R612	225	22.5	2003-000738	R-M ETAL OXIDE(S)	56Kohm,5%,2W,AA,TP,4x12mm	
R613	176	67.5	2001-000915	R-CARBON	680Kohm,5%,1/4W,AA,TP,2.4x6.4m	
R614	283.5	30.8	2001-000642	REF-CF,330K,5%,1/2W	350V,-600 TO -150PPM/C,R-AXIAL	⚠
R615	246.5	61.5	2001-000374	R-CARBON	15ohm,5%,1/4W,AA,TP,2.4x6.4mm	
R616	268	71	2003-000771	REF-M O,68K,5%,2W(S)	500V,-200 TO +200PPM/C,R-AXIAL	
R617	26.5	176.5	2001-000105	R-CARBON	1.5Kohm,5%,1/4W,AA,TP,2.4x6.4m	
R618	256	45.5	2003-000010	R-M ETAL OXIDE(S)	8.2Kohm,5%,3W,AA,TP,6x16mm	
R619	91	121.3	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R620	203	97	2001-000238	R-CARBON	1.5Kohm,5%,1/2W,AA,TP,3.3x9mm	
R621	86.5	43	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R623	220.5	76	2001-001163	R-CARBON(S)	560ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R624	166.5	71	2001-000077	R-CARBON	47Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R625	157	69	2001-000042	R-CARBON	1Kohm,5%,1/4W,AA,TP,2.4x6.4mm	
R626	197	16.5	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R627	153.8	36	2001-000084	R-CARBON	100Kohm,5%,1/4W,AA,TP,2.4x6.4m	
R629	128	16.8	2001-000077	R-CARBON	47Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R630	135	65.8	2001-000050	R-CARBON	2.7Kohm,5%,1/4W,AA,TP,2.4x6.4m	
R650	307.3	117	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	M/M
R651	304.3	117	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	M/M
R655	298	122	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	M/M
R656	318	122.3	3601-001092	FUSE-FERRULE	125V,2.5A,SLOW-BLOW,EPOXY,7.1x	M/M
RL601	292.8	94.5	3501-000266	RELAY-POW ER	12V,720m/W,5A,2FormA,3mS	⚠ TCO
RL602	274	119.5	3501-000136	RELAY-M INIATURE	12V,360mW,5A,1FormA,10mS,10mS	
SK501	226.5	234.5	4715-000001	SURGE ABSORBER	1KV,+50-10%	
SW201	6	189	3404-000244	SW ITCH-TACT,7.3X7.1X4	12V,50M A,SPST,160G,M ECHANIC	
SW202	6	175	3404-000244	SW ITCH-TACT,7.3X7.1X4	12V,50M A,SPST,160G,M ECHANIC	

Loc. No.	Coordinates (X,Y)		New Code No.	Description	Specification	Remarks
SW203	6	161	3404-000244	SWITCH-TACT,7.3X7.1X4	12V,50MA,SPST,160G,MECHANIC	
SW204	6	147	3404-000244	SWITCH-TACT,7.3X7.1X4	12V,50MA,SPST,160G,MECHANIC	
SW205	6	105	3404-000244	SWITCH-TACT,7.3X7.1X4	12V,50MA,SPST,160G,MECHANIC	
SW206	6	91	3404-000244	SWITCH-TACT,7.3X7.1X4	12V,50MA,SPST,160G,MECHANIC	
SW207	6	77	3404-000244	SWITCH-TACT,7.3X7.1X4	12V,50MA,SPST,160G,MECHANIC	
SW208	6	63	3404-000244	SWITCH-TACT,7.3X7.1X4	12V,50MA,SPST,160G,MECHANIC	
SW209	6	119	3404-000244	SWITCH-TACT,7.3X7.1X4	12V,50MA,SPST,160G,MECHANIC	
SW210	6	133	3404-000244	SWITCH-TACT,7.3X7.1X4	12V,50MA,SPST,160G,MECHANIC	
SW401	80.5	232.5	3406-000002	SWITCH-TOGGLE,SP3T	ON-ON-ON,STRAIGHT	
SW602	299.4	17.5	3403-000190	SWITCH-KEY,SPST	250V,5A,SPST,Y,ANGLE	⚠
T401	91.5	188	BH26-30303Y	TRANS-HOR.DRIVE	6-4(50MH),6P,EE2017,SB-5S,6-	⚠
T501	239	181	BH26-10335M	TRANS-FBT	1.22mH,13P,13,FUR3763,-,FKD-	⚠
T502	128	216	BH26-30337B	TRANS-FOCUS	1.2MH/500MH,7P,EE-1916,PL-3,PM	⚠
T601	217.5	26.5	BH26-20336C	TRANS-POWER(S/W)	430uH/417uH,16P,EI3541,PL-3,7.	⚠ M/M
T602	212	100	BH26-30338A	TRANS-SYNC.	260uH/260uH,5P,SQN-2114,M2B,26	⚠
TH601	306	99.8	1404-000002	THERMISTOR-NTC	NTC,9OHM,20%	⚠
TH602	266	93	1404-001020	THERMISTOR-NTC	8ohm,15%,17mW/C,BK	⚠
VR201	313.9	210.5	2101-001008	vr3	1/20W	
VR202	313.9	235.5	2101-001008	vr3	1/20W	
VR401	233	235.5	2103-000291	vr3	1/10W	
VR501	251.5	235.5	2103-000005	vr3	1/10W	
X201	50.5	43.5	2802-001083	RESONATOR-CERAMIC	4MHz,0.25%,TP,9.5x6.5x5	

9-2 Video PCB Parts

Loc.No.	Coordinates (X,Y)		New Code No.	Description	Specification	Remarks
BD101	65	45.8	3301-000011	MAG-CORE,FERRITE,BEAD	1.2UH,3.5_5.7MM,10OHM	
BD102	11.7	35.4	3301-000011	MAG-CORE,FERRITE,BEAD	1.2UH,3.5_5.7MM,10OHM	
BD103	12.5	106	BH39-40305U	JUMPER	JUMPER	
BD104	13.5	72	3301-000011	MAG-CORE,FERRITE,BEAD	1.2UH,3.5_5.7MM,10OHM	
BD105	62.8	31.8	3301-000011	MAG-CORE,FERRITE,BEAD	1.2UH,3.5_5.7MM,10OHM	
BOTTOM			2201-000291	C-CERAMIC	500V 102J	
C101B	60.3	13.3	2401-000028	C-AL	10uF,20%,50V,GP,5x11mm,5mm,TP	
C101G	54.3	13.3	2401-000028	C-AL	10uF,20%,50V,GP,5x11mm,5mm,TP	
C101R	38.5	13	2401-000028	C-AL	10uF,20%,50V,GP,5x11mm,5mm,TP	
C102B	77.8	20.3	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20%,50V,Y5V,2.3X3.0	
C102G	77.8	25.8	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20%,50V,Y5V,2.3X3.0	
C102R	77.8	31.3	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20%,50V,Y5V,2.3X3.0	
C103B	48.3	81.8	2301-000010	C-FILM,PEF	100nF,5%,100V,11.5x12.5mm,5mm	
C103G	29	81.8	2301-000010	C-FILM,PEF	100nF,5%,100V,11.5x12.5mm,5mm	
C103R	64	108.8	2301-000010	C-FILM,PEF	100nF,5%,100V,11.5x12.5mm,5mm	
C104B	81.5	64	2401-000043	C-AL	1uF,20%,160V,GP,6.3x11mm,5mm,T	
C104G	76.5	76.8	2401-000043	C-AL	1uF,20%,160V,GP,6.3x11mm,5mm,T	
C104R	76.5	97	2401-000043	C-AL	1uF,20%,160V,GP,6.3x11mm,5mm,T	
C110	14.8	98.3	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C111	12.5	113.8	2401-000042	C-AL	100uF,20%,16V,GP,6.3x7mm,2.5mm	
C112	10.3	81.8	2301-000010	C-FILM,PEF	100nF,5%,100V,11.5x12.5mm,5mm	
C113	10.3	67.5	2401-000033	C-AL	100uF,20%,100V,GP,13x20mm,5mm	
C114	31	29	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C115	41	29	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C116	45	28.3	2401-000042	C-AL	100uF,20%,16V,GP,6.3x7mm,2.5mm	
C117	36	29	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C118	83.5	42	2201-000285	C-CERAMIC,DISC	1nF,10%,1KV,Y5P,8.0X4.0,5,TP	
C119	26.8	43.5	2201-000530	C-CERAMIC,DISC	4.7nF,10%,500V,Y5P,12.5x4,5,TP	
C120	56.5	28.3	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C121	49	28.3	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C122	66	31.8	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C123	42.8	14.8	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C124	47	13	2401-000042	C-AL	100uF,20%,16V,GP,6.3x7mm,2.5mm	
C125	13.5	75.5	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C126	19.5	23	2401-000023	C-AL	1uF,20%,50V,GP,5x11mm,5mm,TP	
C127	65	17.5	2401-000023	C-AL	1uF,20%,50V,GP,5x11mm,5mm,TP	
C129	28.3	24	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C130	24.5	24.3	2201-000017	C-CERAMIC,DISC	1nF,10%,50V,Y5P,4x3.5,5,TP	
CF202	7	7	3711-003240	CBF-HARNESS	15P,200MM,RED/GRN/BLU/WHT/BL	
CN102	24.5	56	BH71-40300A	PIN-HINGE	BRASS,D2.36,SN,HEAT/SINK	
CN103	78	41.5	BH71-40300A	PIN-HINGE	BRASS,D2.36,SN,HEAT/SINK	
CRT1	78	41.5	BH03-10301G	M34KUK35X01	BRASS,D2.36,SN,HEAT/SINK	
D101	20.5	29	0402-000007	DIODE-RECTIFIER	1N4937GP,600V,1A,DO-41	
D101B	34	95.8	0401-000006	DIODE-SWITCHING	BAV21,200V,250mA,400mW,50nS,DO	
D101G	29	95.8	0401-000006	DIODE-SWITCHING	BAV21,200V,250mA,400mW,50nS,DO	
D101R	26.5	95.8	0401-000006	DIODE-SWITCHING	BAV21,200V,250mA,400mW,50nS,DO	
D102	14	110.8	0401-000005	DIODE-SWITCHING	1N4148,75V,150mA,500mW,4nS,DO-	

Loc. No.	Coordinates (X,Y)		New Code No.	Description	Specification	Remarks
D102B	39	106.8	0401-000006	DIODE-SWITCHING	BAV21,200V,250mA,400mW,50nS,DO	
D102G	46.5	106.8	0401-000006	DIODE-SWITCHING	BAV21,200V,250mA,400mW,50nS,DO	
D102R	51.5	106.8	0401-000006	DIODE-SWITCHING	BAV21,200V,250mA,400mW,50nS,DO	
D103B	76.3	68	0401-000005	DIODE-SWITCHING	1N4148,75V,150mA,500mW,4nS,DO-	
D103G	71.3	86.8	0401-000005	DIODE-SWITCHING	1N4148,75V,150mA,500mW,4nS,DO-	
D103R	73.3	107	0401-000005	DIODE-SWITCHING	1N4148,75V,150mA,500mW,4nS,DO-	
EY101	58.4	105.9	6042-000001	EYELET	ID2.2,OD2.7,L3.1,SN,BSS3-E/EH	
EY102	7.6	105.9	6042-000001	EYELET	ID2.2,OD2.7,L3.1,SN,BSS3-E/EH	
EY103	7.6	87.7	6042-000001	EYELET	ID2.2,OD2.7,L3.1,SN,BSS3-E/EH	
EY104	58.4	87.7	6042-000001	EYELET	ID2.2,OD2.7,L3.1,SN,BSS3-E/EH	
EY105	33	57.7	6042-000002	EYELET	ID1.5,OD2,L3.1,SN,BSS3-E/EH	
EY106	48.7	63.5	6042-000002	EYELET	ID1.5,OD2,L3.1,SN,BSS3-E/EH	
EY107	48.7	46	6042-000002	EYELET	ID1.5,OD2,L3.1,SN,BSS3-E/EH	
HS102	33	97.3	BH62-30410B	HEAT/SINK	A6063S,T1.8,ALL	
IC101	34.5	17.3	1201-001184	IC-VIDEO AMP	2141,DIP,20P,300MIL,SINGLE,P	⚠
IC102	41.5	117.3	1204-000010	IC-CHANNEL SELECTOR	LM2406,T0-220,11P,PLASTIC,85	⚠
JP167			3301-000011	MAG-CORE,FERRITE,BEAD	1.2UH,3.5_5.7MM,10OHM	
L101B	53	91.8	2701-001036	INDUCTOR-AXIAL	1.2uH,10%,9.8x4.2mm	
L101G	38	86.5	2701-001036	INDUCTOR-AXIAL	1.2uH,10%,9.8x4.2mm	
L101R	63.8	103.8	2701-001036	INDUCTOR-AXIAL	1.2uH,10%,9.8x4.2mm	
Q101	3.5	50	0501-000412	TR-SMALL SIGNAL	KSP42,NPN,625mW,TO-92,40	
Q102	10.5	57.5	0501-000321	TR-SMALL SIGNAL	KSB1116-Y,PNP,0.75W,TO-92,13	
R100	70.5	9.3	2001-000029	R-CARBON	100ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R101B	71.3	23	2001-000089	R-CARBON	150Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R101G	71.3	28.5	2001-000090	R-CARBON	180Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R101R	71.3	34	2001-000089	R-CARBON	150Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R102B	21	12.8	2001-000665	R-CARBON	33ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R102G	21	10.3	2001-000665	R-CARBON	33ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R102R	21	7.8	2001-000665	R-CARBON	33ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R103B	16.5	8	2001-000025	R-CARBON	75ohm,5%,1/4W,AA,TP,2.4x6.4mm	
R103G	13.8	8	2001-000025	R-CARBON	75ohm,5%,1/4W,AA,TP,2.4x6.4mm	
R103R	11	8	2001-000025	R-CARBON	75ohm,5%,1/4W,AA,TP,2.4x6.4mm	
R104B	41.5	106.8	2001-000021	R-CARBON	27ohm,5%,1/4W,AA,TP,2.4x6.4mm	
R104G	44	106.8	2001-000021	R-CARBON	27ohm,5%,1/4W,AA,TP,2.4x6.4mm	
R104R	49	106.8	2001-000021	R-CARBON	27ohm,5%,1/4W,AA,TP,2.4x6.4mm	
R105B	73.3	70.5	2001-000084	R-CARBON	100Kohm,5%,1/4W,AA,TP,2.4x6.4m	
R105G	71.3	89.5	2001-000084	R-CARBON	100Kohm,5%,1/4W,AA,TP,2.4x6.4m	
R105R	73.3	110	2001-000084	R-CARBON	100Kohm,5%,1/4W,AA,TP,2.4x6.4m	
R107B	60	79	2001-000028	R-CARBON(S)	100ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R107G	66	84.3	2001-000028	R-CARBON(S)	100ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R107R	63	84.3	2001-000028	R-CARBON(S)	100ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R108B	74.5	55.3	2001-000029	R-CARBON	100ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R108G	82.3	81.3	2001-000029	R-CARBON	100ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R108R	82.3	101.5	2001-000029	R-CARBON	100ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R109B	77.5	63.3	2001-000495	R-CARBON	20Kohm,5%,1/4W,AA,TP,2.4x6.4mm	
R109G	84.3	84	2001-000495	R-CARBON	20Kohm,5%,1/4W,AA,TP,2.4x6.4mm	
R109R	84.3	104	2001-000495	R-CARBON	20Kohm,5%,1/4W,AA,TP,2.4x6.4mm	

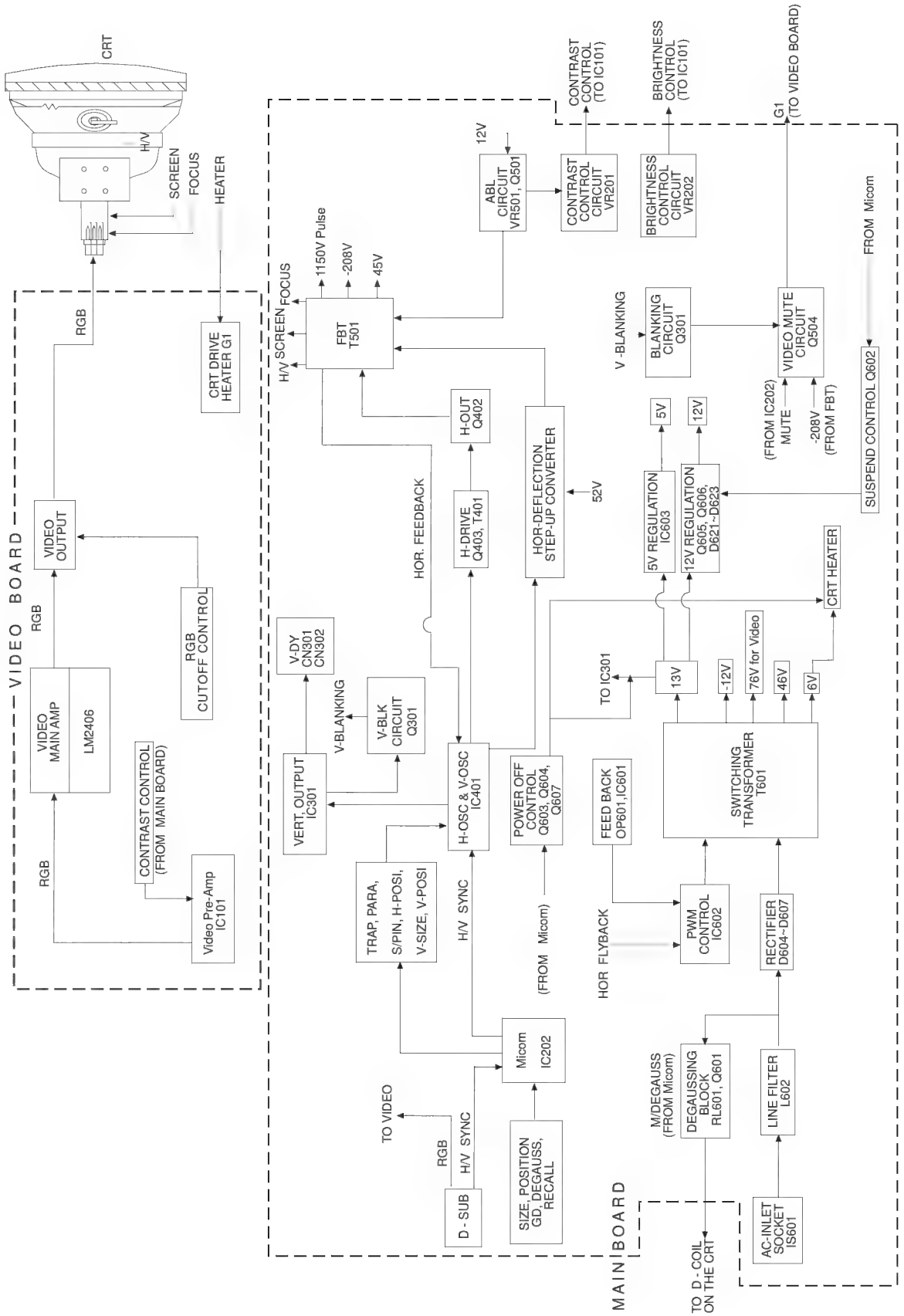
Loc. No.	Coordinates (X,Y)		New Code No.	Description	Specification	Remarks
R110	31.5	95.8	2001-001070	R-CARBON(S)	120ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R111	14.8	22.8	2001-000029	R-CARBON	100ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R112	12.5	101.5	2001-000835	R-CARBON	51Kohm,5%,1/4W,AA,TP,2.4x6.4mm	
R113	26	29.3	2001-000029	R-CARBON	100ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R114	44.8	43.5	2001-000511	R-CARBON	220ohm,5%,1/2W,AA,TP,3.3x9mm	
R116	28.5	29.3	2001-000043	R-CARBON	1Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R117	38.5	29	2001-000039	R-CARBON	390ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R118	33.5	29	2001-000039	R-CARBON	390ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R119	54	28.3	2001-000039	R-CARBON	390ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R120	13	47	2001-000056	R-CARBON	4.7Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R121	11.5	53.5	2001-000090	R-CARBON	180Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R122	4.5	60.5	2001-000077	R-CARBON	47Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
SK101	65	41	4715-000001	SURGE ABSORBER	1KV,+50-10%	
SK102	40.8	47	4715-000106	SURGE ABSORBER	300V,CHIP	
SK103	55	54.8	3704-001042	SOCKET-CRT	7P,22.5PI,12PI,SN	
VR101B	82.8	17.3	2103-000007	vr3	1/10W	
VR101G	82.8	25.8	2103-000007	vr3	1/10W	
VR101R	82.8	34.3	2103-000007	vr3	1/10W	
VR102B	82.8	58.8	2103-000291	vr3	1/10W	
VR102G	82.8	78.3	2103-000291	vr3	1/10W	
VR102R	82.8	97.8	2103-000291	vr3	1/10W	

Others

Loc. No.	Code No.	Description	Specification	Remarks
CRT	BH03-10335J	CRT-COLOR,15",0.28	M36LGE23XX01,SINGLE	
	BH03-10337M	CRT-COLOR,15",0.28	M36LGE23XX01(F1QWIR)	
	BH03-10336X	CRT-COLOR,15",0.28	M36LGE27XX01(F1QWIR)	
	BH03-10013A	CRT-COLOR,15",0.28	M36LGE27XX01,EX-2,0.25	
CRT GND	BH39-40364R	CBF-CRT GROUND	2P,390MM,BLK,UL1015,AWG18	
D-COIL	BH27-10335K	DEGAUSSING COIL	300X225X950,8.2MH,17.2OHM,100T	
	BH27-10336A	DEGAUSSING COIL	300X225X950,8.2MH,17.2OHM	
MAGNET RUBBER	3302-000006	MAG-RUBBER MAGNET	AF,14G,1620-1980G,0.58-0.9MGOE	
P/CORD	BH39-10001A	CBF-POWER CORD	DET,WELL,125V/10A,IVORY,185	
	BH39-10006A	CBF-POWER CORD	DET,H05VV-F,250V/6A,IVY,1830MM	
	BH39-10007A	CBF-POWER CORD	DET,H05VV-F,250V/10A,IVY,1830MM	
SIGNAL CABLE	BH39-20336H	CBF-SIGNAL	DET,1530MM,15P/15P,IVORY	
	BH39-203367J	CBF-SIGNAL	DET,1530MM,15P/15P(THUMB),IVORY	

Memo

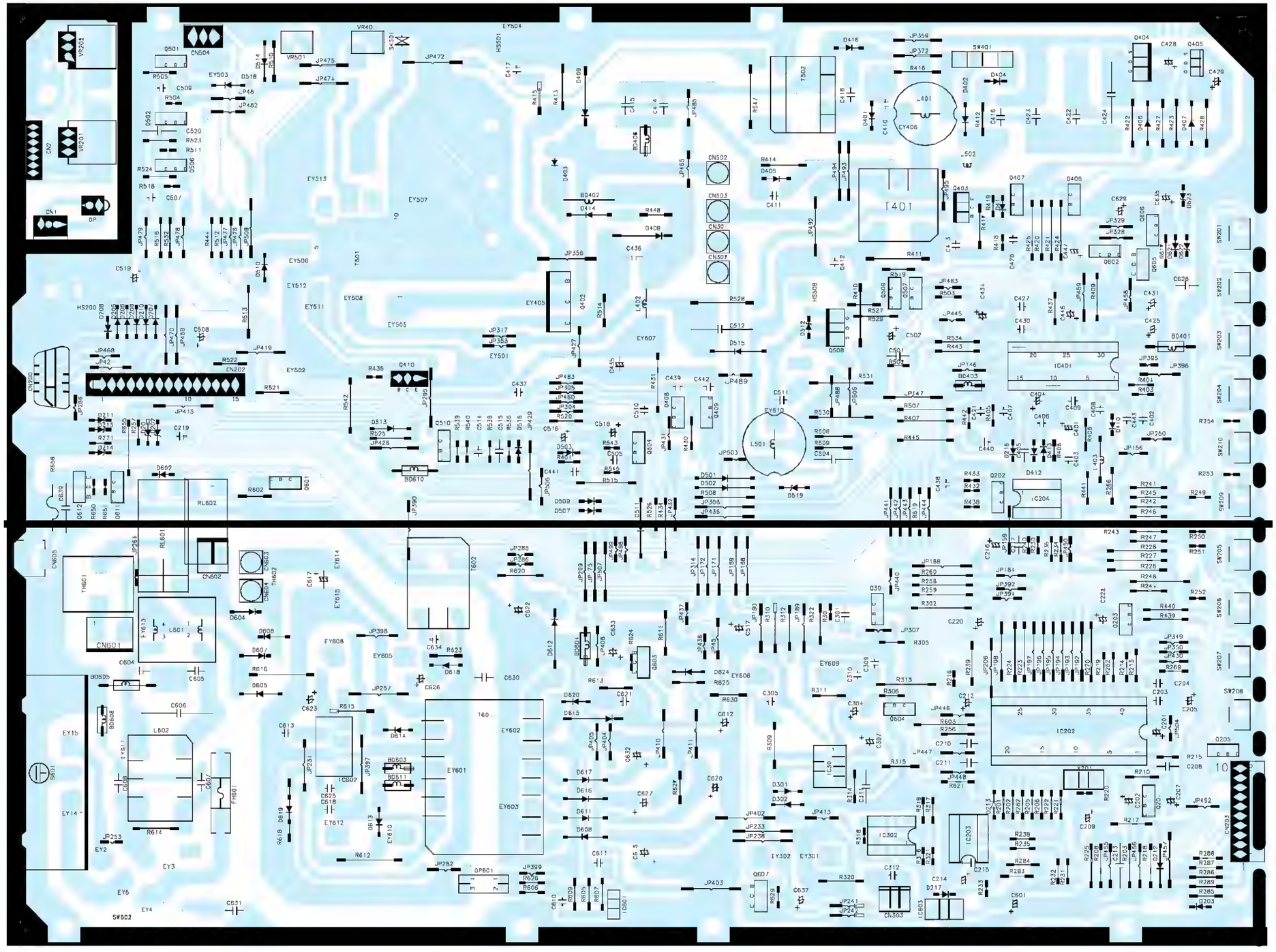
10 Block Diagram



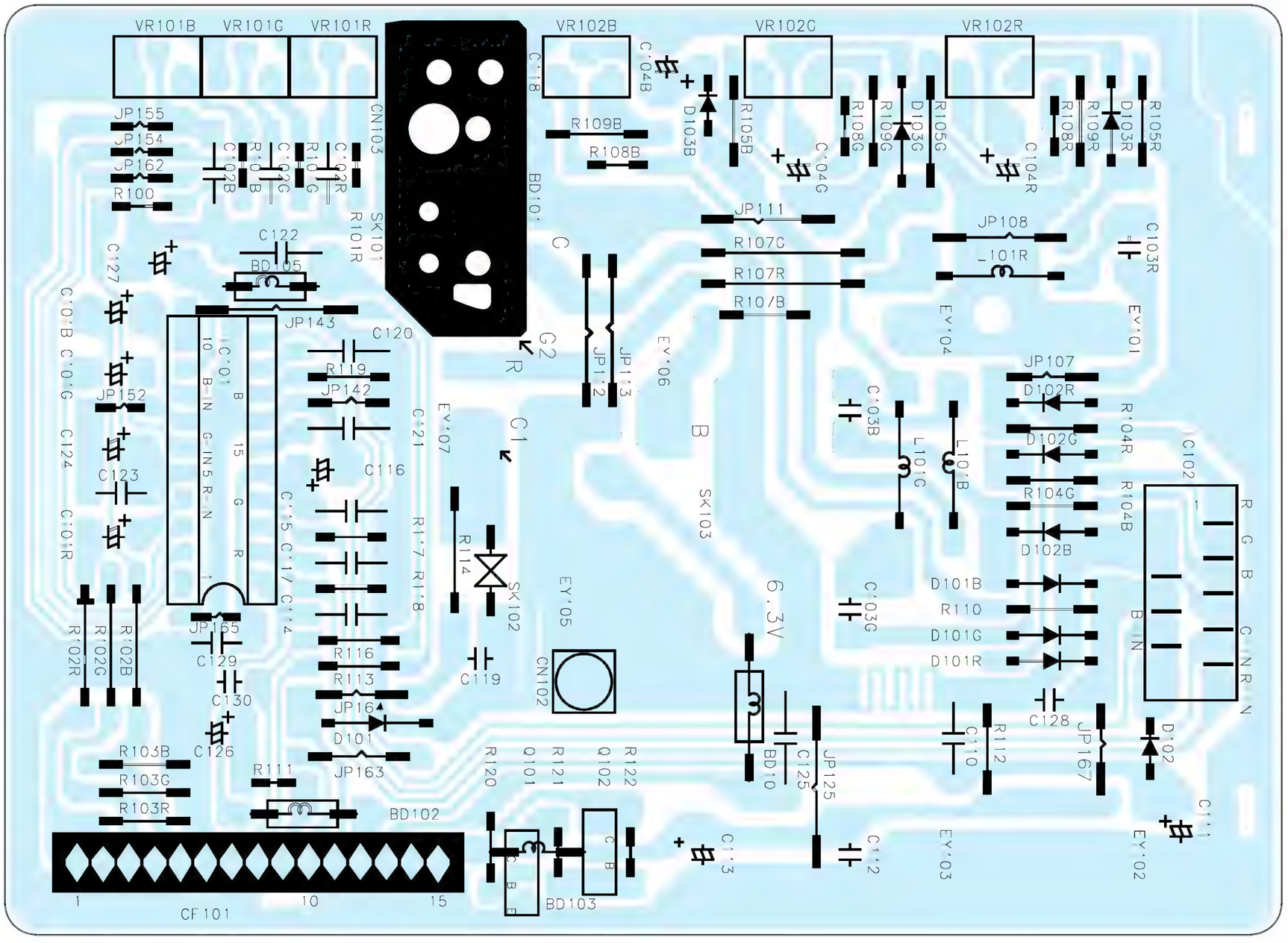
Memo

11 PCB Diagrams

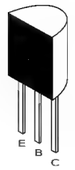
11-1 Main PCB (Bottom View)

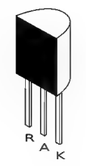
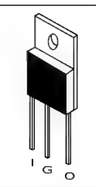
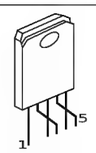


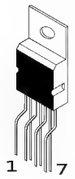
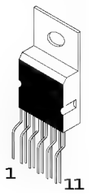
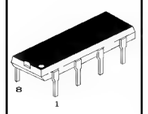
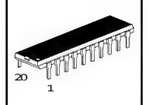
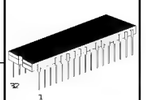
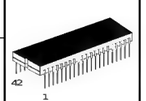
11-2 Video PCB (Bottom View)



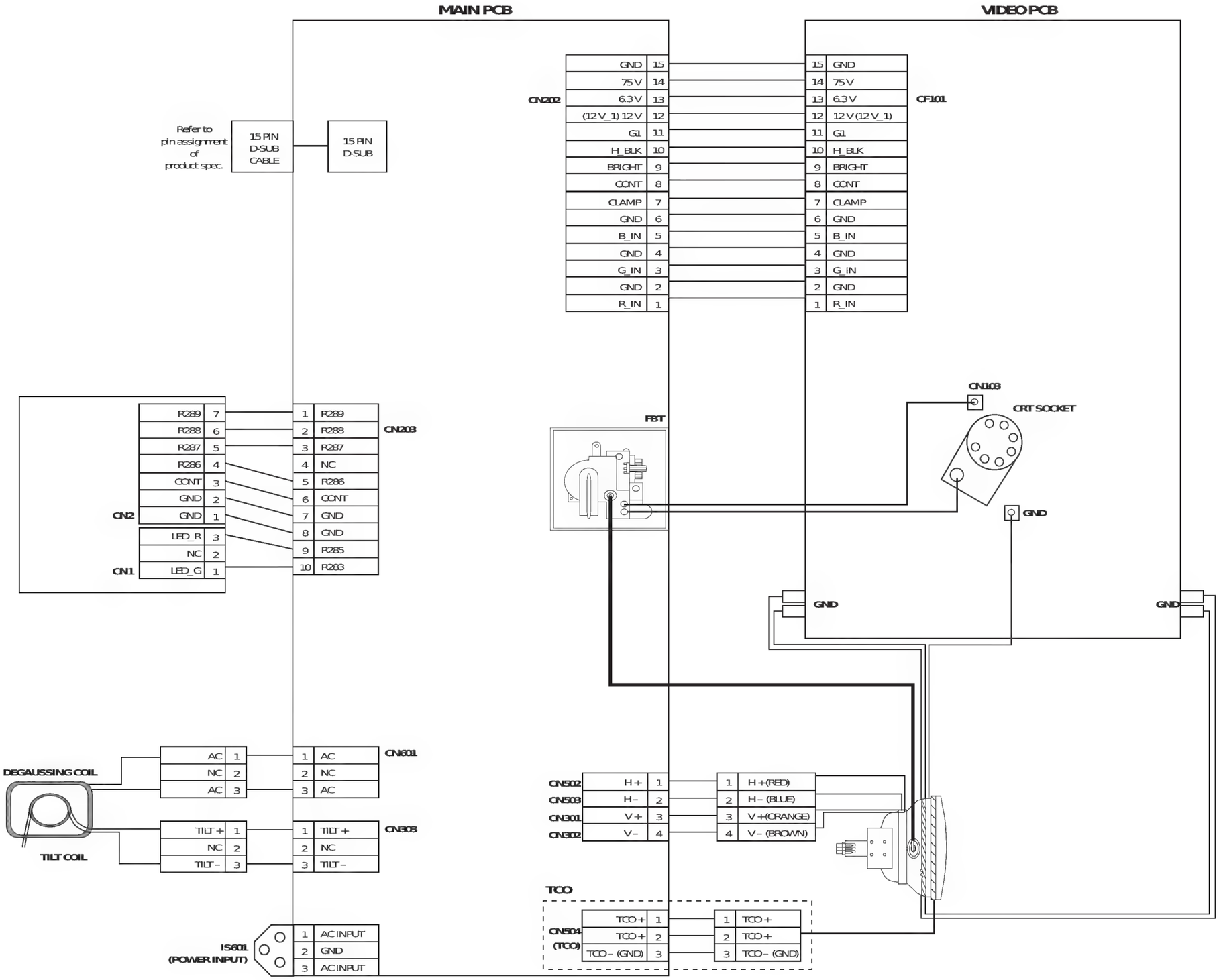
11-3 Semiconductor Lead Identification

PARTS	TYPE NO.	REF. NO.
	YG121S15	D403
	KSC945	Q201, Q205, Q301, Q406, Q407, Q501, Q502, Q507, Q601, Q602, Q604, Q606, Q611
	KSA733	Q203, Q408, Q409, Q506, Q509
	2N3904	Q202
	KSP42	Q101
	2N6520	Q504
	MPS3646	Q510
	KSB1116	Q102, Q603, Q605, Q607, Q612
	KSC3503-D	Q403
	KSB800	Q410
	IRF630	Q404, Q508

PARTS	TYPE NO.	REF. NO.
	KSC5088	Q402
	KA431	IC601
	MC7805	IC603
 1 : Drain, 2 : GND, 3 : Vcc, 4 : F/B, 5 : Sync	KA2H0680	IC602
	IRFR/U230A	Q405
	LTV817M-SM	QP601

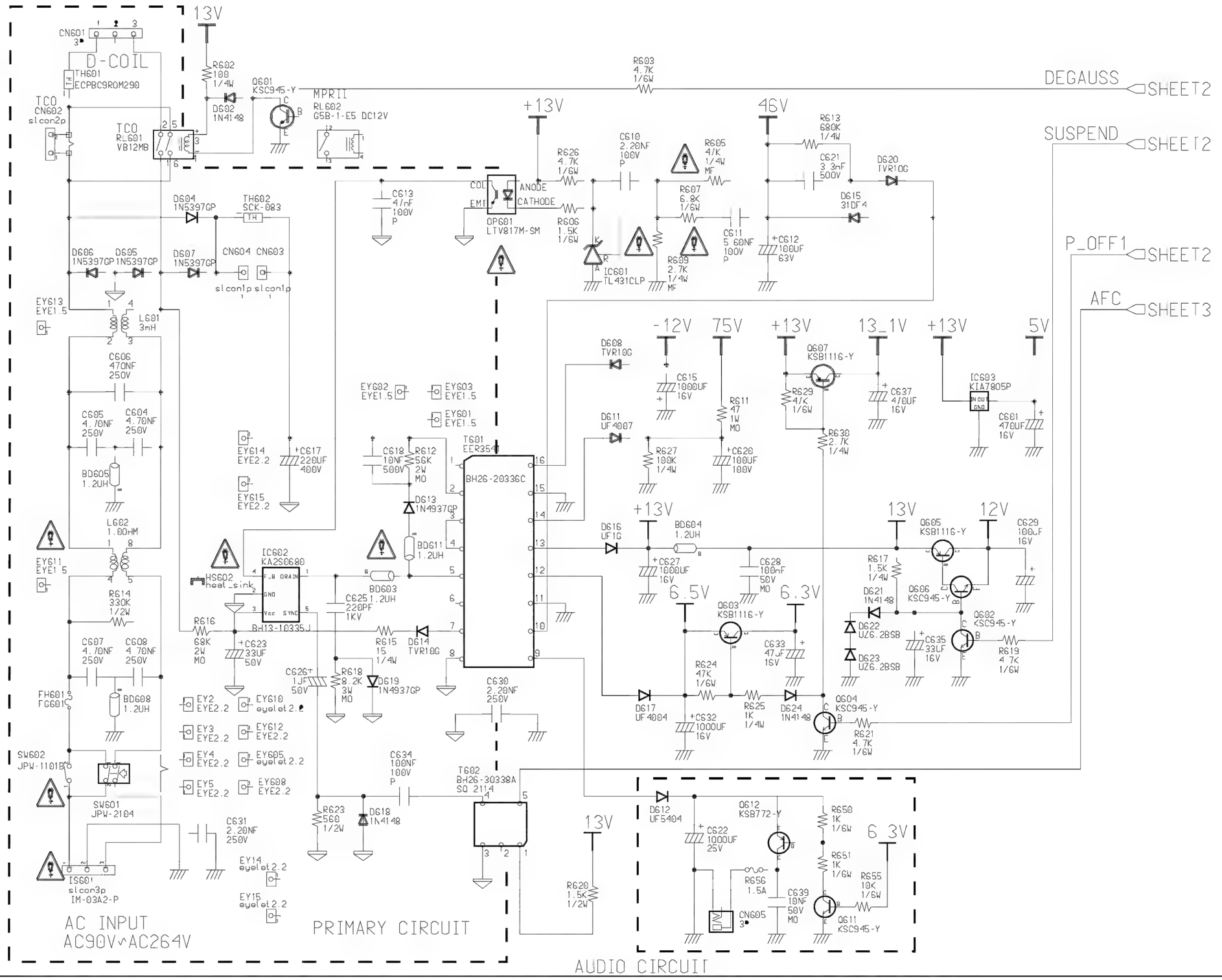
PARTS	TYPE NO.	REF. NO.
	TDA9302H	IC301
	LM2406	IC102
	24LC04 24LC21 L272M	IC203 IC204 IC302
	KA2141	IC101
	TDA9109	IC401
	MC68HC705	IC202

Memo

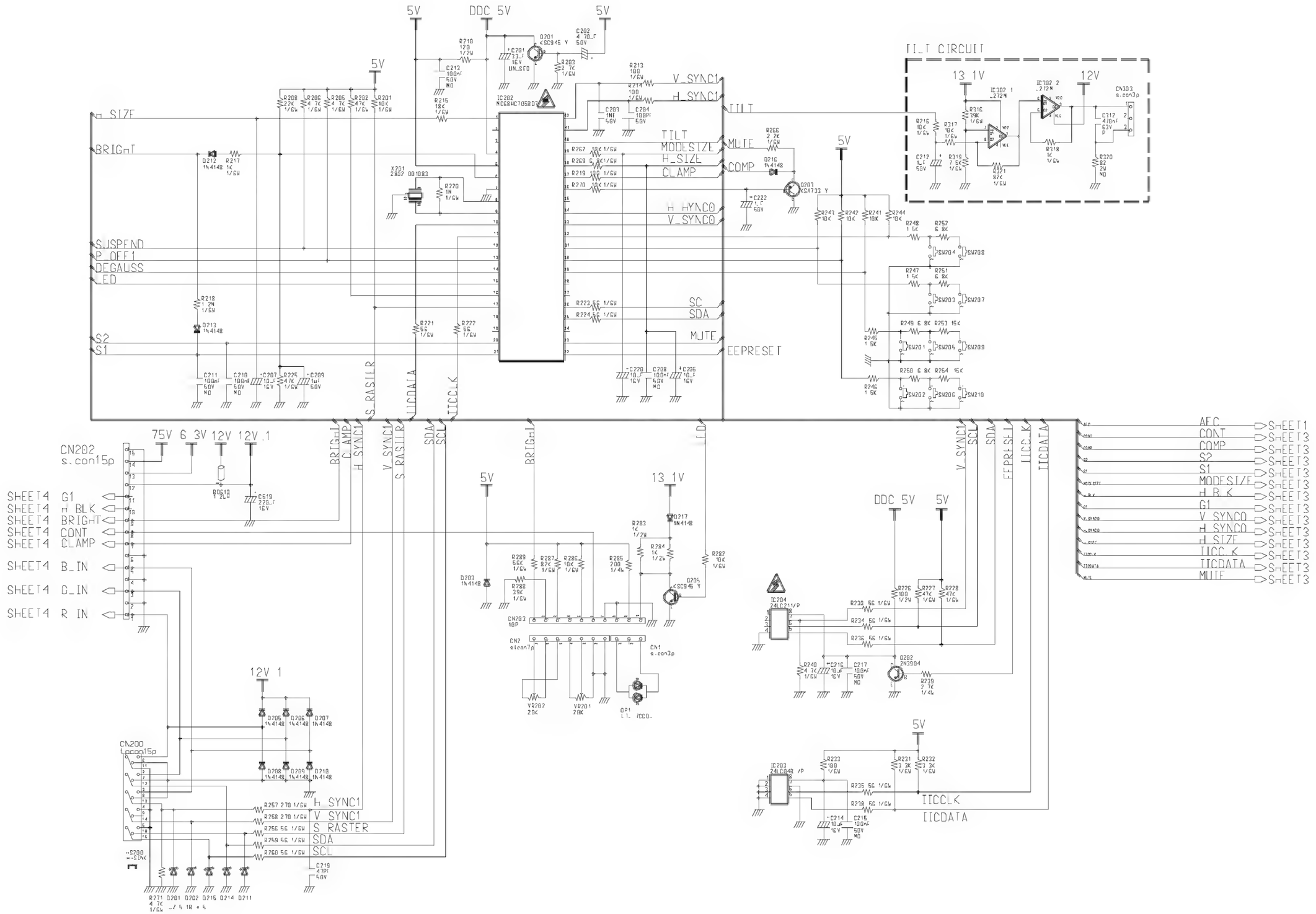

MAIN PCB
VIDEO PCB
Refer to pin assignment of product spec.
15 PIN D-SUB CABLE
15 PIN D-SUB
CN202
GND 15
75V 14
6.3V 13
(12V_1) 12V 12
G1 11
H_BLK 10
BRIGHT 9
CONT 8
CLAMP 7
GND 6
B_IN 5
GND 4
G_IN 3
GND 2
R_IN 1
CF101
15 GND
14 75V
13 6.3V
12 12V(12V_1)
11 G1
10 H_BLK
9 BRIGHT
8 CONT
7 CLAMP
6 GND
5 B_IN
4 GND
3 G_IN
2 GND
1 R_IN
CN103
CRT SOCKET
GND
GND
GND
FBT
CN2
R289 7
R288 6
R287 5
R286 4
CONT 3
GND 2
GND 1
CN1
LED_R 3
NC 2
LED_G 1
CN203
1 R289
2 R288
3 R287
4 NC
5 R286
6 CONT
7 GND
8 GND
9 R285
10 R283
DEGAUSSING COIL
AC 1
NC 2
AC 3
CN601
1 AC
2 NC
3 AC
TILT COIL
TILT+ 1
NC 2
TILT– 3
CN303
1 TILT+
2 NC
3 TILT–
IS601
(POWER INPUT)
1 AC INPUT
2 GND
3 AC INPUT
CN502 H+ 1
CN503 H– 2
CN301 V+ 3
CN302 V– 4
1 H+(RED)
2 H–(BLUE)
3 V+(ORANGE)
4 V–(BROWN)
TCO
CN504
(TCO)
TCO+ 1
TCO+ 2
TCO–(GND) 3
1 TCO+
2 TCO+
3 TCO–(GND)

Memo

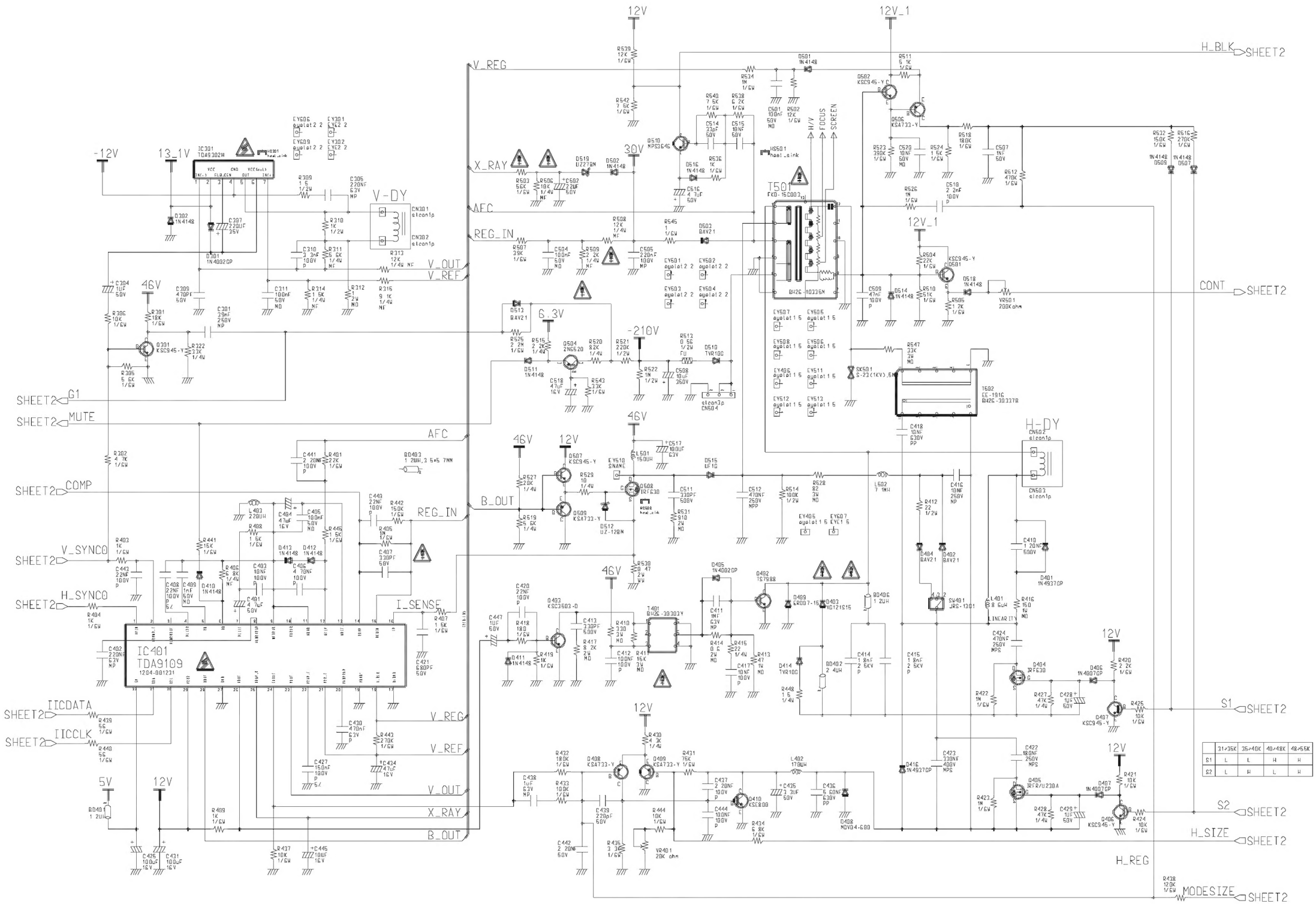
13-1 Power Part Schematic Diagram



13-2 Micro Part Schematic Diagram



13-3 H/V Part Schematic Diagram



	31>35K	35>40K	40>48K	48>55K
S1	L	L	H	H
S2	L	H	L	H

13-4 Video Part Schematic Diagram

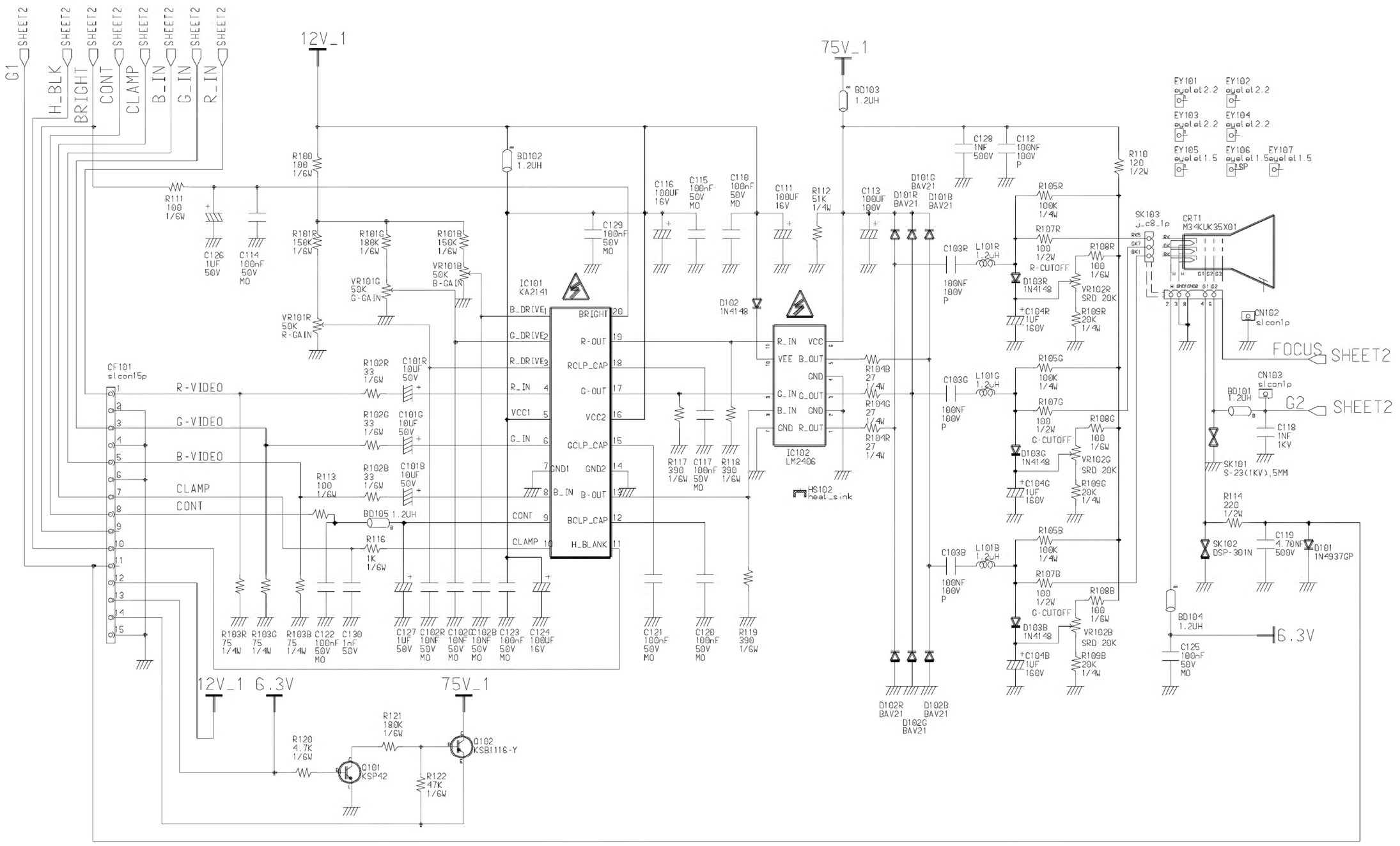


Table 12-1. IC101 (KA2141)

pin #	MODES		pin #	MODES	
	1024 x 768 / 60 Hz	640 x 480 / 60 Hz		1024 x 768 / 60 Hz	640 x 480 / 60 Hz
1	1.47	1.47	11	4.37	4.13
2	1.74	1.74	12	5.79	5.8
3	1.84	1.84	13	3.42	3.35
4	2.39	2.39	14	GND	GND
5	11.65	11.66	15	5.52	5.53
6	2.38	2.38	16	11.65	11.66
7	GND	GND	17	3.53	3.46
8	2.39	2.39	18	5.49	5.50
9	0.16 ~3.04	0.16~3.04	19	3.59	3.52
10	4.99	4.93	20	1.5 ~2.1	1.5 ~2.1

Unit: Vrms

Table 12-2. IC102 (LM2406)

pin #	MODES	
	1024 x 768 / 60 Hz	640 x 480 / 60 Hz
1	44.72	46V
2	GND	GND
3	43.83	45.09
4	GND	GND
5	44.60	46
6	75.66	72.77
7	GND	GND
8	3.42	3.35
9	3.53	3.47
10	11.66	11.66
11	3.59	3.52

Unit: Vrms

Table 12-3. IC202 (68HC705)

pin #	MODES		pin #	MODES	
	1024 x 768 / 60 Hz	640 x 480 / 60 Hz		1024 x 768 / 60 Hz	640 x 480 / 60 Hz
1	0~5	0~5	21	–	–
2	0~5	0~5	22	–	–
3	0~5	0~5	23	5.05	5.05
4	5.03	5.03	24	5.05	5.05
5	5.05	5.05	25	3.82	3.82
6	–	–	26	3.68	3.68
7	GND	GND	27	–	–
8	2.46	2.46	28	5.05	5.05
9	2.08	2.08	29	5.03	5.03
10	5.03	5.03	30	5.02	5.02
11	5.03	5.03	31	5.02	5.02
12	–	–	32	5.03	5.03
13	–	–	33	–	–
14	–	–	34	–	–
15	–	–	35	–	–
16	4.94	4.94	36	–	–
17	–	–	37	4.98	4.98
18	–	–	38	–	–
19	–	–	39	–	–
20	–	–	40	5.03	5.03

Unit: Vrms

Table 112-4. IC203 (24LC04B)

pin #	MODES	
	1024 x 768 / 60 Hz	640 x 480 / 60 Hz
1	GND	GND
2	GND	GND
3	GND	GND
4	GND	GND
5	5.02	5.02
6	5.03	5.03
7	GND	GND
8	5.05	5.05

Unit: Vrms

Table 12-5. IC204 (24LC21/P)

pin #	MODES	
	1024 x 768 / 60 Hz	640 x 480 / 60 Hz
1	–	–
2	–	–
3	–	–
4	GND	GND
5	3.82	3.82
6	3.68	3.68
7	4.78	4.78
8	4.99	4.99

Unit: Vrms

Table 12-6. IC301 (TDA9302)

pin #	MODES	
	1024 x 768 / 60 Hz	640 x 480 / 60 Hz
1	1.09	1.09
2	12.98	12.98
3	10.90	10.90
4	10.99	10.99
5	5.5	5.5
6	12.92	12.92
7	1.09	1.09

Unit: Vrms

Table 12-7. IC302 (L2M2M)

pin #	MODES	
	1024 x 768 / 60 Hz	640 x 480 / 60 Hz
1	9.57	9.57
2	13.02	13.02
3	9.54	9.54
4	11.03	11.03
5	9.54	9.54
6	9.57	9.57
7	2.12	2.12
8	2.13	2.13

Unit: Vrms

Table 12-8. IC401 (TDA9109)

pin #	MODES		pin #	MODES	
	1024 x 768 / 60 Hz	640 x 480 / 60 Hz		1024 x 768 / 60 Hz	640 x 480 / 60 Hz
1	–	–	17	GND	GND
2	–	–	18	7.04	7.04
3	5.06	5.06	19	GND	GND
4	3.026	3.026	20	5.30	5.30
5	4.02	4.02	21	8.04	8.04
6	2.374	2.374	22	3.51	3.51
7	2.378	2.378	23	3.44	3.44
8	7.97	7.97	24	2.901	2.901
9	–	–	25	6.73	6.73
10	9.32	9.32	26	2.772	2.772
11	–	–	27	GND	GND
12	-0.5	-0.5	28	1.633	1.633
13	7.91	7.91	29	12.05	12.05
14	2.349	2.349	30	5.04	5.04
15	4.65	4.65	31	5.04	5.04
16	36.8mV	36.8mV	32	5.04	5.04

Unit: Vrms

Table 12-9. IC601 (TL431CLP)

pin #	MODES	
	1024 x 768 / 60 Hz	640 x 480 / 60 Hz
1	2.52	2.52
2	GND	GND
3	10.69	10.69

Unit: Vrms

Table 12-10. IC602 (KA2S0680)

pin #	MODES	
	1024 x 768 / 60 Hz	640 x 480 / 60 Hz
1	189.5	189.5
2	GND	GND
3	19.70	19.70
4	2.389	2.389
5	4.8	4.8

Unit: Vrms

Table 12-11. IC603 (7805)

pin #	MODES	
	1024 x 768 / 60 Hz	640 x 480 / 60 Hz
1	13.04	13.04
2	GND	GND
3	5.09	5.09

Unit: Vrms

Memo